

**ASSESSING DIFFERENCES IN STRENGTH AND CONDITIONING COACH
SELF-PERCEPTIONS OF LEADERSHIP STYLE AT THE NBA, DIVISION I,
AND DIVISION II LEVEL**

by

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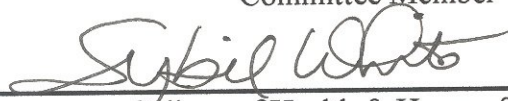
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Intelligence appears to be the thing that enables a man to get along without education. Education appears to be the thing that enables a man to get along without the use of his intelligence.

-A.E. Wiggan

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Chapter I

Introduction

A substantial body of literature exists on the coaching behaviors and leadership styles of sport team coaches (Beam, Serwatka, & Wilson, 2004; Bloom, Crumpton, & Anderson, 1999; Bloom, Stevens, & Wickwire, 2003; Chelladurai, 1984, Frederick & Morrison, 1999; Jambor & Zhang, 1997; Kenow & Williams, 1992, 1999; Smith, Smoll, & Hunt, 1977; Smoll & Smith, 1989; Williams, Jerome, Kenow, Rogers, & Sartain, 2003). However, very little literature explores the coaching behaviors and leadership styles of strength and conditioning coaches at the Division I, Division II, or the professional level (Brooks, Ziatz, Johnson, & Hollander, 2000).

An athletic coach predominately focuses on the skill side of athletics, the specifics directly related to their chosen sport. For example, a football team has offensive line coaches, defensive line coaches, and a quarterback coach to name just a few. In basketball, each coach has a specific role from offensive play design, to drawing up defensive formations, assisting with passing and shooting drills, or scouting other teams and giving reports to the head coach. Strength coaches, on the other hand, have a significant role in educating the athlete on the importance of weight training. Specifically, they help to mold the athlete's perceptions and attitudes toward conditioning and training (Poiss, Sullivan, Paup, & Westerman, 2004).

Strength and conditioning coaches are individuals who are hired independently of the athletic coaches (though it is not uncommon for an athletic coach—especially a head football coach—to bring in their own strength coach). They are hired to develop general and sport specific fitness for the athletes. With many colleges, especially the Division I

schools, there is a head strength coach (who may or may not go by this title), several assistants, and possibly a graduate assistant or intern. This will vary by program, as some large Division I schools have separate head strength coaches, with one being responsible for Olympic sports (all sports except football) and one being solely responsible for the football program.

Typically though, there is a head strength coach who is responsible for the football program and while the other strength and conditioning coaches assist, their main responsibility lies divided up amongst the remaining teams (the Olympic sports). At the professional level, the strength and conditioning coaches' deal with only one team (their respective pro team). At the Division II level, there is usually only one strength coach (if there is one at all) who is responsible for all sports. Or, if there is a football program, the DII strength and conditioning coach is primarily responsible for the football program. To compensate for this at the Division II level, where most institutions cannot afford a full time strength coach, an assistant or head athletic coach will fill the strength and conditioning job position for their team; thus, they act as both an athletic coach and a strength and conditioning coach.

At its most rudimentary level, the job of the strength and conditioning coach can be divided up into three areas: (1) injury prevention, (2) in-season maintenance of the athlete's physical shape, and (3) off-season and pre-season increases in the athlete's strength, power, flexibility, and levels of anaerobic and aerobic conditioning (Martinez, 2004; Massey, Maneval, Phillips, Vincent, White, & Zoeller, 2002; Massey, Vincent, & Maneval, 2004). By performing their role, they reduce the likelihood of athletic injury,

prevent regression of physical capabilities, and help the athlete become more physically competitive due to improvements in muscular coordination, strength, power, agility, and aerobic and anaerobic fitness.

With strength and conditioning, each level of competition comes with its own unique set up emphases. There has been shown to be a difference in emphases between the high school and collegiate ranks (Durell, Pujol, & Barnes, 2003; Komarek, 1996) wherein high school strength coaches perceived improving performance as their top priority while Division I strength coaches held their top goal as injury prevention. One could then hypothetically surmise that there are differences between DI, DII, and professional level athletics. Incidentally, there is no evidence to support this because there is no research that directly compares the unique training emphases and leadership styles of strength and conditioning coaches at these three competitive levels. Even so, it is interesting to consider the possible differences that might exist because of competitive level in terms of the relationship between a player and strength and conditioning coach because the strength and conditioning coach must have an effective and athlete-compatible leadership style.

With regards to their team and sport, the head athletic coach is the one in charge and the strength and conditioning coach fills a supportive role (unless there is a situation as mentioned at the Division II level). Thus, the leadership style and coaching behaviors of a strength coach will likely be quite different from those of a head coach. The head coach, being the one in charge, will more than likely not change their coaching style for their athletes. Instead, they will attract and recruit athletes who are comfortable with

their style of coaching. Strength and conditioning coaches must typically adapt and change with their supporting role—if not for the athletes, then for the coaches.

The strength coaches must adjust their leadership style to respond to the *life-cycle* needs specific to the individuals for which they are responsible (Hersey & Blanchard, 1982). Collegiate players do not have the choices that NBA players do with regards to working out. You workout with your assigned strength coach or not at all; at the collegiate level you cannot pick and choose who you want to be your instructor. NBA strength coaches on the other hand must convince their athletes to train sufficiently hard and often enough with the uniquely tailored training protocol. They cannot always manage the situation in the way they would like to (i.e. the athlete does the routine I want them to do, when I want them to do, etc.). Instead, the strength coach manages the situation in the way they know they must, since it so happens to be the requirements of their own unique situation. If they do not adjust, the professional athlete can always hire their own trainer and if enough of the athletes do this, then the strength coach risks losing their job.

At the Division I level the role is slightly different. The strength coach serves in a more autocratic role, though they must be democratic with the coaches for whom they must satisfy. They are the weight room disciplinarians and for the most part, the athletes either do it their way, or do not work out. A professional athlete might say to their strength coach, “I really don’t like squats.” Most likely the strength coach will accommodate them. The same statement at the Division I level would be met with a response along the lines of, assuming they do not have a medical excuse, “Too bad”.

This is in part because of the coach-player authority structure found in Division I athletics, but also because the strength and conditioning coach cannot specialize a routine like they can at the professional level.

Collegiate strength and conditioning coaches can, to some degree, tailor a program for their athletes but when you have multiple teams and dozens and dozens of athletes to train, it is not feasible to design individualized routines for every athlete. One, this would be far too time consuming, especially since the routines would have to be constantly evaluated and modified. Consider a football squad, where the strength coach would have to design well over a hundred individualized routines. Two, the weight room would be too chaotic and difficult to monitor. You might have athletes front squatting in one area, back squatting in another, bench pressing in yet another, and your ability to safely monitor is worn too thin. Third, a DI strength coach cannot work with each athlete individually or do extensive physical testing and therefore they must consider the financial and environmental constraints that are imposed upon them.

The Division II level is afforded even less training opportunities for specialization than the other two competitive levels because of finances (and possibly the lack of a properly qualified strength and conditioning coach on staff). This would, in most cases, especially apply to DII basketball team, since they would quite likely not possess the same budget and resources as a DII football team. Often times there is not a full-time strength coach unless the institution has a football team and so if there is any sort of strength and conditioning going on, it is most likely going to be in the hands of an assistant basketball coach or head basketball coach. At this level, the resources will be a

fraction to what is available at the Division I and professional level. Also, since the strength coach most likely has to fulfill another role, their ability to focus purely on strength and conditioning will be a fraction of the time and energy a full time DI or professional level strength coach has at their disposal. Thus, the relationship between athletes will not be between that of one between athlete and strength coach, but one between an athlete and their athletic coach. However, unlike the NBA strength coach or the Division I strength coach, since an assistant or head athletic coach might be responsible for their training, the athlete's effort and attitude while doing strength and conditioning may affect their playing status.

The literature pertaining to strength and conditioning does not examine leadership styles at any of these competitive levels. What data does exist for the collegiate or professional levels of strength and conditioning are mostly confined to demographic information and strength and conditioning practices (Brooks, et al., 2000; Durell et al., 2003; Ebben & Blackard, 2001; Ebben, Carroll, & Simenz, 2004; Ebben, Hintz, & Simenz, 2005; Martinez, 2004; Massey et al., 2004; Massey et al., 2002; Pullo, 1992; Simenz, Dugan, & Ebben, 2005; Sutherland & Wiley, 1997). What is needed is an examination of the demographic information (i.e. gender, ethnicity, age, salary, educational background, coaching experience, educational sources, etc.), training methods (what type of athletic testing, what type of equipment is used, how many times per week do your athletes train, etc.), and leadership styles at various competitive levels (professional, DI, and DII).

Therefore, the primary purpose of the present study is to examine the differences in self-perceived leadership styles of NBA, Division I men's basketball, and Division II men's basketball strength and conditioning coaches. In addition, frequency data about demographic information, sources of information used by strength coaches and various training methods employed for each of the three divisions will be explained.

Chapter II

Literature Review

“Leadership is the art of getting someone else to do something you want done because he wants to do it.”
~ Dwight Eisenhower

The main points of this literature review have been divided into five categories: (1) Theories of Leadership, (2) Sport Leadership Models and Scales, (3) Coach-Athlete Relationship, (4) Strength and Conditioning Coaches, and (5) Strength and Conditioning Protocols.

Theories of Leadership

Leadership, as defined by Barrow (1977) and Stogdill (1974) is “the behavioral process of influencing the activities of an organized group toward specific goals and the achievement of those goals” (Murray & Mann, 2001, p.83). Researchers have attempted to explain the dynamics of leadership from several theoretical perspectives.

One of the first theories assessing leadership was the trait theory which focused on personality characteristics and traits of the leader. It proposed that leaders were born, not made. In other words, if an individual did not have the right genetic make-up to be a leader, he/she could not be an effective leader. A main concern with this approach is that it does not explain differences in leadership style and it does not provide a model of effective leadership behaviors for all situations (Murray & Mann, 2001). A second theory of leadership assessed the behaviors of the leader and how the leader leads, not who a leader is. Chelladurai and Saleh (1978) found that athletes preferred the leadership behaviors of training for competitiveness, social support, and being rewarded from their coach. Even so, what is preferred is still considered to be highly situational and therefore

it appears that leadership is too complex to be confined to one theory or the other (Murray & Mann, 2001).

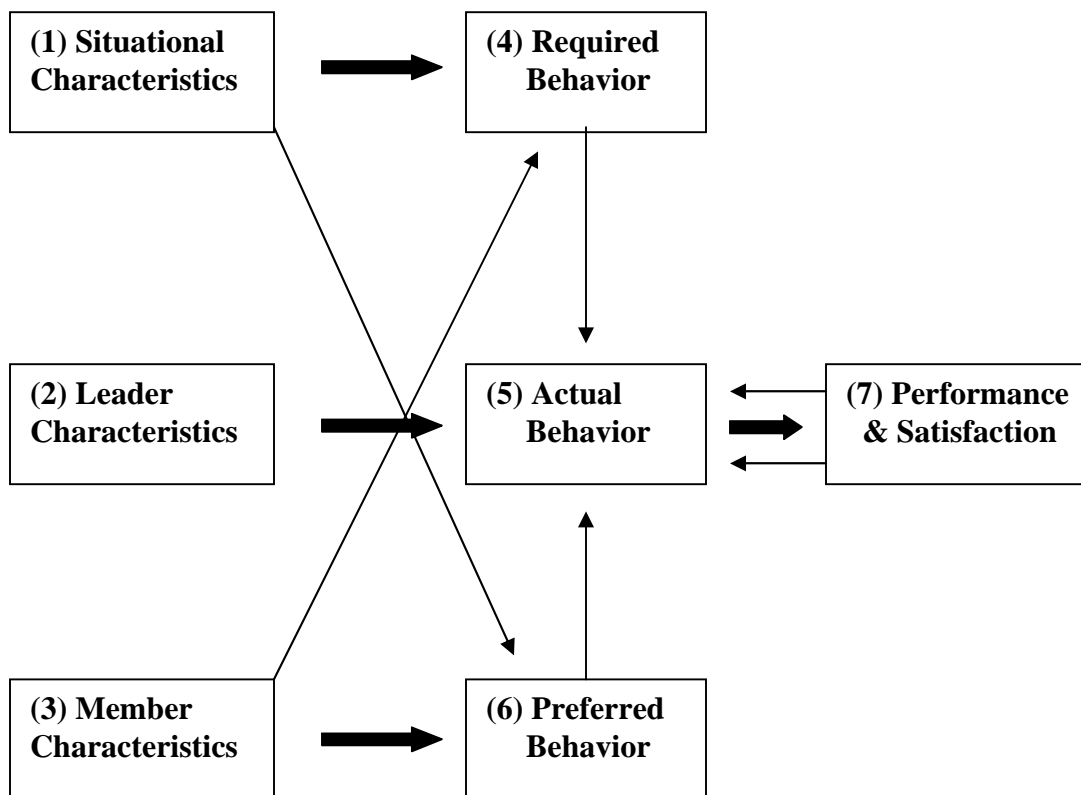
The third theory concerning leadership is the situational theory. This approach states “leadership successes are the characteristics of subordinates, the organizational situation, and the demands of the specific situation” (Murray & Mann, 2001, p.86). Once again though, there is no conclusive and simple answer to effective leadership styles than can be derived from the situational theory, which then lends to the last theory. The final theory of leadership is the transformational theory. This model explains that a leader develops a vision which excites and converts potential followers. Bass and Avolio (1990) asserted that a transformational leader will influence by their ability to inspire, empower, and intellectually stimulate others towards the fulfillment of higher needs. No different than the trait theory, behavioral theories, and situational theories, the transformational theory is not by itself detailed or multifaceted enough to explain leadership effectiveness.

Multidimensional Model of Sport Leadership and the Leadership Scale for Sports

The Multidimensional Model of Sport Leadership (Chelladurai & Saleh, 1978) was proposed in order to determine if certain leadership theories were applicable to the sporting environment. The theory addresses the interactions of both the coach and the athlete in an athletic or sporting environment. It has been seen as the only model that utilized research findings from sport in its formulation (Weiss & Friedrichs, 1986) and it incorporates several theories, including the conceptual framework of trait, behavior, and situation leadership theories (Hersey & Blanchard, 1969, 1977; Osborn & Hunt, 1975; Sherman, Fuller, & Speed, 2000).

The Multidimensional Model places an equal emphasis on three elements: (1) the leader, (2) the group members, and (3) the situations. It proposes that athletic performance and satisfaction are the two main consequences of interaction between the three perspectives of coaching behaviors: (1) required behavior, (2) actual behavior, and (3) the preferred behavior of the athlete. Directly influencing the three perspectives of coaching behavior are: (1) situational characteristics, (2) coach characteristics, and (3) athlete characteristics (Chelladurai, 1990; Chelladurai & Saleh, 1980; Chelladurai, 1980; Chelladurai & Carron, 1978;). Chelladurai (1978) hypothesized that optimal performance and group satisfaction occurs when the three aspects of leader behavior agree.

Figure 1. The Multidimensional Model of Sport Leadership (Chelladurai, 1980)



To test aspects of the Multidimensional Model, the Leadership Scale for Sports (LSS) was developed to measure the relationship between coaching behaviors and athlete motivation (Chelladurai & Riemer, 1998; Chelladurai & Saleh, 1980). The five dimensions of the LSS are:

- (1) *Training (instructional behaviors)*. This is a coach who is oriented toward training and instruction and who scores high in trying to improve the athletes' performance through technical instruction on skills, techniques, and strategies. This is accomplished through an emphasis on rigorous training and by coordinating team activities.
- (2) *Democratic behavior (decision-making style)*. This is a coach who allows athletes to participate in the decision making process (a democratic style), whether it be goal setting, training protocols, or game strategies.
- (3) *Autocratic behavior (decision-making style)*. Opposite of democratic behavior, an autocratic coach is independent in their decision-making. This type of coach places a high value on personal authority in working with the decisions and so athlete input is generally not solicited.
- (4) *Social support (motivational tendencies)*. This is a coach who shows concern for the welfare of athletes and tries to establish good rapport with them. Support-oriented feedback is independent of the athletes' performance and typically goes beyond the athletic arena.
- (5) *Positive feedback (motivational tendencies)*. This type of coach typically gives a consistent amount of praise or rewards for a positive athletic

performance. However, positive feedback, unlike social support, is limited to the athletic arena and contingent upon athletic performance.

There are three versions of the LSS: (1) athlete preference, (2) athlete perception, and (3) coach self-evaluation. Each addresses the same five dimensions of coaching leadership. One concern about the LSS is that it does not have a category for situational behavior (Jambor & Zhang, 1997; Zhang, Jensen, & Mann, 1996). The situational leadership theory states that leaders should vary their behaviors relative to their surrounding environment. Several attempts have been made at improving the LSS (Horne & Carron, 1985; Weiss & Friedrich, 1986; Westre & Weiss, 1991) but not until recently has a new version been devised that addressed the lack of a situational behavior category.

The Revised Leadership Scale for Sports (RLSS) (Jambor et al., 1997; Jambor & Zhang, 1996) is a revised version of the LSS that adds a sixth dimension, situational considerations (i.e. sets up individual goals, varies ways to reach those goals, differentiates behaviors based upon environmental constraints, et al.). It is seen as an advancement because: (1) the measurement properties of the coaching self-evaluation version were tested and improved and (2) the overall factor structures in determining the constructs of the scale were substantially improved (Jambor & Zhang, 1997; Zhang et al., 1996). However, the RLSS (Jambor & Zhang, 1997; Zhang et al., 1996) has not been investigated with athletes' perceptions and preferences in relation to the coaches' perceptions of leader behavior (a comparison). The three: athlete preference, athlete perception, and coach self-evaluation have been investigated separately. They suggest

greater and more detailed understanding of the perceptions and interactions of coaches and athletes.

Coach-Athlete Relationship

The nature of the coach is important to consider when examining the intricacies of the coach-athlete relationship and how coaching leader behaviors are significantly related to team outcomes (Carron & Dennis, 2001). Some reasons for this are that providing contingent positive feedback and reinforcement along with socially supportive behaviors have been associated with satisfied athletes (Weiss & Friedrichs, 1986). Further, the way a coach behaves affects how an athlete will perceive and recall these behaviors at some point and then eventually how they will come to recognize their coach's behaviors, whether it be positive or negative (Smith, Smoll, & Barnett, 1995; Smith, Smoll, & Curtis, 1978). Finally, there are the fundamental needs for competence, autonomy, and relatedness, and if these needs are not properly met, that can impact an individual's intrinsic motivation (Amorose & Horn, 2000, 2001; Hollembeak & Amorose, 2005).

Researchers have investigated the factors that may influence an athlete's perceptions and evaluation of coaching behaviors (Allen & Howe, 1998; Amorose & Horn, 2000; Beam et al., 2004; Chelladurai, 1984; Hollembeak & Amorose, 2005; Jambor & Zhang, 1997; Kenow & Williams, 1992, 1999; Sherman, Fuller, & Speed, 2000; Westre & Weiss, 1991; Williams et al., 2003). Subsequently, it has been found that athletes who felt more compatible with their coach experienced fewer negative cognitive/attentional and somatic effects from their coach's behaviors. Athletes who felt more compatible also felt more supported by their coach and evaluated his/her communication ability more favorably.

If the athlete's goals, personality, and beliefs are consistent with those of their coach, the interaction of the individuals will likely be satisfactory to both parties, therein producing a positive interpersonal atmosphere. Conversely, a downbeat interaction between the coach and the athlete can also create a negative interpersonal atmosphere, which fosters the likelihood of their being an unproductive and unbeneficial, negative self-fulfilling prophesy (Kenow & Williams, 1999).

When comparing a coach's perceptions of their behaviors and the athlete's perceptions of the coach's behaviors, there are often times discrepancies. With regards to the LSS, coaches have typically scored themselves higher than the athletes do on training and instruction, democratic, social support, and positive feedback/rewards (Horn & Carron, 1985; Smith, Smoll, & Hunt, 1977; Percival, 1976). Horn and Carron (1985) said coaches typically evaluated themselves in a more positive way than their athletes since there is a tendency to overestimate socially desirable traits while underestimating the socially undesirable characteristics (Horn & Carron, 1985).

Even more specific when considering coaching behaviors and the coach-athlete relationship is that in some cases coaches are more inclined to select an autocratic style over a democratic one based upon the environment (Frederick & Morrison, 1999). For example, athletes have favored a more autocratic decision making process when problems are more complex and when the team has not been integrated very well (Chelladurai & Arnott, 1985). Therefore, in a situation such as this, the athletes may typically favor a democratic style but in this situation they would accept a more autocratic style. Overall, a large body of literature reveals that the majority of the time

athletes prefer a democratic coaching style to an autocratic one (Chelladurai, 1984; Salminen & Liukkonen, 1996; Sherman, Fuller, & Speed, 2000; Westre & Weiss, 1991).

Males are more likely to select an autocratic leadership style than females, who have been found to have a significant preference for democratic leadership behavior where coaches allow more participation in decision-making. Both males and females, however, have a high preference for training and instruction leader behaviors (Beam et al., 2004; Jambor & Zhang, 1997; Sherman et al., 2000; Westre & Weiss, 1991).

Yet, just because males have more consistently shown to have a higher preference than female athletes for autocratic behavior does not mean they inherently favor autocratic over democratic leadership styles. In fact, it has been found that coaches who are excessively high in autocratic behavior would be expected to undermine athletes' intrinsic motivation. The primary reason for this is that this sort of coaching style is not conducive to facilitating athletes' perceptions of self-determination (Amorose & Horn, 2002) and can affect, to some degree, intrinsic motivation (Hollembek & Amorose, 2005). These findings relate to the team building/team cohesion responsibilities of the athletic coach. When dealing with team building and team cohesion, the coaches need to consider both the environment and each athlete individually. It has been suggested that coaches' behaviors and leadership styles need to change from situation to situation as well as from athlete to athlete (Solomon, DiMarco, Ohlson, & Reece, 1998).

There is a necessary harmonic component within the coach-athlete relationship. In one study, Poczwadowski, Barott, & Henschen, (2002) reported the coach-athlete relationship as a recurring pattern of three parts: (1) mutual care between the athlete, (2) the presence of relationship oriented interactions and activities, and (3) specific meanings

which the athletes and coaches attach to their relationship. Their findings also found the more positive, compatible, and strong the coach-athlete relationship, the more beneficial experience the athletes will have in their respective sport (Poczwardowski et al., 2002; Salminen & Liukkonen, 1996). In cases where this has not existed, where the coach-athlete relationship has been negative, incompatible, and weak, there is typically decreased athlete satisfaction, performance, and enjoyment of their respective sport (Price & Weiss, 2000).

Previous findings suggest the importance of understanding the many facets of the coach-athlete relationship, yet for strength and conditioning coaches there is a void in the literature that examines the coach-athlete relationship with respect to the Multidimensional Model. This model places an equal emphasis on the leader, the group members, and the situations, wherein athletic performance and satisfaction are the two main consequences of interaction between the required behavior, actual behavior, and preferred behavior of the athlete (Chelladurai, 1990; Chelladurai, 1984; Chelladurai & Saleh, 1980; Chelladurai & Saleh, 1978). Considering how important the agreement of these aspects has been shown to be in leading to optimal performance and group satisfaction with athletic coaches in practice and in competition (Chelladurai, 1990), it should be more than enough to warrant examining the uniqueness of the strength coach-athlete relationship and how group satisfaction and effective training when performing strength and conditioning could carry over to more effective athletic practices and competitions.

Strength and Conditioning Coaches

The strength and conditioning coach is a crucial component, if not a necessary component, for helping athletes develop and maximize their athletic capabilities. Their job includes: program design, instruction on exercise technique, organization and administration, athletic testing and evaluation, exercise science knowledge, and nutrition (Martinez, 2004). The literature regarding strength coach has typically expanded these categories as well as demographic data (age, pay, race, gender, educational background, etc.).

Research on strength and conditioning is divided up between the collegiate levels and the professional levels. Recent studies have looked at various professional teams and the practices of their strength and conditioning coaches: (1) physical testing, (2) flexibility development, (3) speed development, (4) plyometrics, (5) strength/power development, and (6) the unique aspects of the program (i.e. resistance training philosophies) (Ebben & Blackard, 2001; Ebben, Carroll, & Simenz, 2004; Ebben, Hintz, & Simenz, 2005; Simenz, Dugan, & Ebben, 2005). The research examining the NBA, NFL, NHL, and MLB does not examine demographic information pertaining to pay, gender, race, and appropriate educational, competitive and work experiences as several of the collegiate studies have examined. Instead, the studies wanted confirmation that the strength coaches have been in their respective league for a while, as the focus was less on the key determining factors of a strength coach as they were on the strength and conditioning practices of the coaches (Ebben & Blackard, 2001; Ebben, Carroll, & Simenz, 2004; Ebben, Hintz, & Simenz, 2005; Simenz, Dugan, & Ebben, 2005; Sutherland & Wiley, 1997).

At the collegiate level, the pool of research includes both demographic data and strength coach training methods/practices. First, concerning their background, a majority of strength coaches are Caucasian males who are under the age of forty (Brooks et al., 2000; Martinez, 2004). Also, the strength and conditioning coach's education comprises a bachelor's degree (mostly in an exercise science related field) and a strength and conditioning certification (predominately from the NSCA, which is logical considering the CSCCa certification was not available until 2000) (Brooks et al., 2000; Durell, Pujol, & Barnes, 2003; Massey, Vincent, & Maneval, 2004; Pullo, 1992).

When considering salary there is no definitive research regarding pay. Martinez (2004) found that the average pay for a head strength coach at the Division I and Division II level was: (1) \$57,948 for Division IA and (2) \$33,765 for Division IAA. Subsequent studies, such as those conducted by the CSCCa (2003) have shown a range from >\$100,000 to <\$30,000 for a head strength coach and \$42,000 to \$10,000 for a full-time assistant. However, too few participants are included in the study for it to be representative of Division I strength and conditioning (CSCCa, 2003).

The responsibilities of strength and conditioning coaches at the collegiate level have been shown to also include the role of disciplinarian (apart from their strength and conditioning duties). At the Division II level, strength coaches have been shown to serve dual roles as both a strength coach and an athletic coach (Brooks et al., 2000; Durell, Pujol, & Barnes, 2003; Massey, Vincent, & Maneval, 2004; Pullo, 1992).

The goals and benefits typically associated with a strength and conditioning protocol at the Division I level are injury prevention/reduction, increased strength/power/mass, and enhanced/improved athletic performance (Durell et al., 2003;

Sutherland & Wiley, 1997). In some variance to the college level, one survey showed that high school strength and conditioning coaches indicated that the top goal of their program was improving athletic performance (Komarek, 1996). No data is available for the professional level.

Only one study was found that examined how a strength coach relates to their athletes and what their specific coaching behaviors and leadership styles are when they deal with their athletes. Brooks, Ziatz, Johnson, & Hollander (2000) investigated leadership behavior of Division I coaches using the SCCLSS (Strength and Conditioning Coach Leadership Scale for Sports) in an attempt to find strength and conditioning coach's perceptions of their behavior. It consisted of 40 items, representing the 5 dimensions of leadership behavior: (1) training and instruction, (2) democratic, (3) autocratic, (4) social support, and (5) positive feedback. However, the SCCLSS lacks test-retest reliability and the internal consistency estimates for the SCCLSS were substantially lower than the recommended internal consistency criterion of .70 that was established by Nunnally (1978). Using Cronbach's α coefficient the variables for the SCCLSS were: (1) training and instruction $\alpha = .56$, (2) democratic behavior $\alpha = .48$, (3) autocratic behavior $\alpha = .56$, (4) social support $\alpha = .40$ and (5) positive feedback $\alpha = .43$ (Brooks et al., 2000). Brooks et al. (2000) found no significant differences between head and assistant strength coaches on any of the 5 dimensions of leadership behavior.

Research on the observed behaviors of six strength and conditioning coaches from elite Division I football programs found that behaviors could be divided into three main categories. They are: (1) silent monitoring (21.99%), (2) Management (14.62%) and (3)

Hustle (11.12%). Further when the means of the instructional component were considered, 18.56% of strength coach behaviors fell into the instructional area (Massey, Maneval, Phillips, Vincent, White, & Zoeller, 2002). This is similar to behaviors that have been observed among expert basketball coaches. Bloom, Crumpton, and Anderson (1999) found that out of twelve categories, the top three behaviors expert basketball coaches exhibited were: (1) tactical instruction at 29%, (2) hustle with 16%, and (3) technical instruction at 13.9%. This is interesting because it suggests that coaching behaviors may be similar regardless of whether they are enacted by an athletic coach or a strength and conditioning coach. There may be carry over between effective coaching methods found with athletic coaches to strength and conditioning coaches and vice-versa.

Strength & Conditioning Protocols

When discussing protocols, there is enough literature that an intra-comparative split (meaning comparing groups within their respective division) can be made between collegiate strength and conditioning coaches (Division I and Division II) and professional strength and conditioning coaches (NFL, NBA, NHL, etc.)

At the collegiate level, a majority of strength and conditioning coaches have been shown to utilize periodization, which is “the varying or cycling of training specificity, intensity, and volume to achieve peak levels of conditioning (Baechle & Earle, 2000, p.511). Durell (2003) found that 93% reported periodizing their athletes’ routines. Comparatively, only 28% of high school coaches reported using periodization (Komarek, 1996). As for methods, most strength coaches were reported to incorporate multiple sets, plyometrics, explosive movements, athletic testing, and Olympic lifts (Clean & Jerk and Snatch) with their athletes’ training regimens which is consistent with high school

strength coaches who employ a periodization protocol (Durell, et al., 2003; Ebben & Blackard, 2001; Komarek, 1996).

Similar to the collegiate level, a majority of strength coaches at the professional level do some form of athletic testing and incorporate multiple sets, and explosive movements. Stretching, and speed development are also incorporated into the majority of professional level routines (Ebben & Blackard, 2001; Ebben et al., 2004; Ebben, et al., 2005; Simenz, Dugan, & Ebben, 2005). However, when considering Olympic style weightlifting, there are variations within the professional ranks. A majority (85%) of collegiate strength coaches at the Division I level were shown to use this lifting style. The NBA has shown the highest with 95%, followed by 91.3% for the NHL, but not MLB, which found that only 14.3% of those questioned used Olympic-style lifts (Durell et al., 2003; Ebben et al., 2004; Ebben et al., 2005; Simenz et al., 2005).

For the NBA, NFL, NHL, and MLB it was found that a majority of strength coaches within each utilize periodization. The highest was the NHL with 91.3% and the NBA with 90% and MLB with 83.4% followed that closely. The lowest (but still a majority) was the NFL where only 69.2% of the coaches were found to periodize their athletes' routines (Durell et al., 2003; Ebben & Blackard, 2001; Ebben et al., 2004; Ebben et al., 2005; Simenz et al., 2005).

The collective results found with these studies presents a picture that is in agreement with the accepted description of a strength and conditioning coach put forth by Kraemer (Martinez, 2004). Kraemer, a former NSCA director and current editor of the *Journal of Strength and Conditioning Research* (as of 2006), had determined that the

primary skill and fundamental job of the strength and conditioning professional was to prescribe appropriate exercises for training athletes so that it aided in the prevention of sport injuries and enhanced sport performance. Further, the strength coach must also be able to perform skills pertaining to administration, organization, motivation of athletes, exercise techniques and public relations (Martinez, 2004).

Very rarely do studies examine strength and conditioning coaches at the professional level. This may be because there is not a large market for data concerning professional strength and conditioning coaches since there are so few teams associated with this elite competitive level. In addition, only 21.5% of the surveyed Division I head strength coaches set their career goal at being in the pro ranks (Pullo, 1988). Since 1988, 80% of the surveyed Division I coaches cited they were happy with the status quo (Martinez, 2004). This suggests that there is either not as much of an audience for research pertaining to the professional level or there is, but most Division I-A strength coaches realize the small odds of getting established with a pro team and so they have contented themselves with college athletics.

Regardless, comparing coaching styles of collegiate strength coaches and the NBA strength and conditioning coaches seems much needed in the strength and conditioning field. It would allow the aspiring collegiate and professional level strength and conditioning coach to see typical coaching style differences as well as descriptive data pertaining to strength and conditioning coaches at each level, which can inform them as to what they should be incorporating into their own arsenal of coaching behaviors and training protocols.

Research Question

- * Is there a difference between NBA, DI, and DII strength and conditioning coaches' self-perceptions of their coaching leadership behaviors (training & instruction, democratic, autocratic, social support, positive feedback, and situational)?

Hypothesis

- * There is a difference between self-reported strength and conditioning coach coaching behaviors. Each of the strength and conditioning coach levels (NBA, DI, & DII) will report different coaching behaviors.

Significance

The impact of the current research project was to provide: (1) data on statistical differences on the self-perceived leadership styles of NBA, Division I, and Division II strength and conditioning coaches, (2) demographic information on the three strength and conditioning coach competitive levels, and (3) frequency data on the three levels of strength and conditioning coaches' sources of information and training methods.

This research data will help the strength and conditioning and sport psychology fields by examining various competitive levels, leadership styles, and training methods as they pertain to training athletes in a strength and conditioning setting, rather than an athletic competition setting; thus, the data from the examination can begin to fill the aforementioned voids in the strength and conditioning and sport psychology literature.

Chapter III

Method

Participants

The participants were: 22 NBA strength and conditioning coaches, 92 Division I men's basketball strength and conditioning coaches, and 31 Division II men's basketball strength and conditioning coaches.

Table 1 presents complete demographic data on strength and conditioning coaches. In general, males dominated the strength and conditioning coach pool at each level: NBA (22 males), DI (89 males : 3 females), and DII (31 males). Caucasian was the most common ethnicity at each level (77% or more). For the NBA, the mean age was 40.23 years (SD = 8.901), DI was 32.89 years (SD =5.708), and DII was 32.43 years (SD = 6.474). Bachelor and Masters Degrees were held by all three strength and conditioning groups; more specifically, 96% had either a Bachelor or Masters, with three-fourths of DI strength coaches having a MS degree. Over 90% of NBA and DI strength and conditioning coaches had a human performance related degree while only about 50% of DII strength coaches held such a degree.

Table 1

Strength & Conditioning Coach Demographics

<i>Category</i>	<i>NBA (#)</i>	<i>Division 1 (#)</i>	<i>Division 2 (#)</i>
Number of Participants	22	92	31
Age			
Average	40.23	32.89	34.23
SD	8.90	5.70	6.74
Range	26-60	24-50	23-52
Gender			
Male	100% (22/22)	96.7% (89/92)	100% (31/31)
Ethnicity			
Caucasian	77.3% (17/22)	84.8% (78/92)	77.4% (24/31)
African	9.1% (2/22)	7.6% (7/92)	9.7% (3/31)
Hispanic	4.5% (1/22)	1.1% (1/92)	3.2% (1/31)
Asian	4.5% (1/22)	2.2% (2/92)	3.2% (1/31)
Other	4.5% (1/22)	4.3% (4/92)	6.5% (2/31)
Education			
Bachelor	40.9% (9/22)	21.7% (20/92)	48.4% (15/31)
Master	59.1% (13/22)	76.1% (70/92)	48.4% (15/31)
Doctorate	0% (0/22)	2.2% (2/92)	0% (0/31)
No Degree	0% (0/22)	0% (0/22)	3.2% (1/31)
Human Performance Related Degree			
Yes	95.5% (21/22)	91.3% (84/92)	51.6% (16/31)

= Responding Number of Participants / Total Number of Participants

Table 2 presents strength and conditioning coach information related to positions. NBA strength and conditioning coaches on average have been coaching considerably longer than DI or DII strength coaches: NBA (M = 12.41 years), DI (M = 6.6 years), and DII (M = 2.71). NBA strength and conditioning coaches have also had a longer average tenure than DI or DII strength coaches: NBA (M = 7.55 years), DI (M = 4.52), and DII (M = 3.42). In both the NBA and DI competitive level, over 65% of strength and conditioning coaches do not serve another role. This is particularly true of DI strength coaches (81.5%). Only 19.4% of DII strength coaches said they were only in the role of a strength and conditioning coach for men's basketball.

Table 2

Strength and Conditioning Coach Job Relevant Information

<i>Category</i>	<i>NBA (#)</i>	<i>Division 1 (#)</i>	<i>Division 2 (#)</i>
Total Years as a Strength Coach			
Mean	12.41	6.6	2.71
SD	8.44	4.76	3.53
Range	1-26	<1-23	<1-14
Total Years in Current Position			
Mean	7.55	4.52	3.42
SD	6.71	7.10	2.61
Range	1-20	<1-20	1-11
Total # of S&C Job Moves			
Mean	2.32	1.76	.55
SD	1.81	*	1.312
Range	0-6	0-7	0-6
Serve in an Additional Job Capacity			
No	68.2 (15/22)	81.5 (75/92)	19.4 (6/31)
Head BB Coach	0 (0/22)	0 (0/92)	22.6 (7/31)
Assistant BB Coach	9.1 (2/22)	5.4 (5/92)	45.2 (14/31)
Athletic Trainer	9.1 (2/22)	2.2 (2/92)	9.7 (3/31)
Other	13.6 (3/22)	7.6 (7/92)	3.2 (1/31)

= Responding Number of Participants / Total Number of Participants

* = SD data missing from SPSS program

Table 3 presents strength and conditioning coach salaries. Most notable was that the majority (81.8%) of NBA strength and conditioning coaches make more than \$80,000 per year. The highest average for DI strength coaches was \$40-49,999 (34.8%) with only 5 (5.4%) making greater than \$80,000. The highest average for DII was \$30-39,999 (38.7%) with no strength coaches making over \$60,000.

Table 3

Strength and Conditioning Coach Salaries

<i>Category</i>	<i>NBA (#)</i>	<i>Division 1 (#)</i>	<i>Division 2 (#)</i>
Salary			
<\$20,000	0% (0/22)	1.1% (1/92)	19.4% (6/31)
\$20-29,999	0% (0/22)	14.1% (13/92)	9.7% (3/31)
\$30-39,999	0% (0/22)	13% (12/92)	38.7% (12/31)
\$40-49,999	9.1% (2/22)	34.8% (32/92)	19.4% (6/31)
\$50-59,999	0% (0/22)	22.8% (21/92)	9.7% (3/31)
\$60-69,999	9.1% (2/22)	7.6% (7/92)	0% (0/31)
\$70-79,999	0% (0/22)	1.1% (1/92)	0% (0/31)
>80,000	81.8% (18/22)	5.4% (5/92)	0% (0/31)
Not Given	0% (0/22)	0% (0/92)	3.2% (1/31)

= Responding Number of Participants / Total Number of Participants

Instrumentation

Demographic & Training Method Questionnaire. The demographic characteristics assessed for the strength and conditioning coaches included: age, gender, ethnicity, pay, education, strength and conditioning certifications, job-related experience, duties performed as a strength and conditioning coach, and salary. A list of questions, derived from previous research (Durell et al., 2003; Martinez, 2004), were included to assess the training methods and sources of information most frequently employed for strength and conditioning purposes by the strength and conditioning coaches. This questionnaire can be found in Appendix A.

Revised Leadership Scale for Sport (RLSS) (Zhang et al., 1996; Jambor & Zhang, 1997). The RLSS is a revised version of the LSS (Chelladurai & Saleh, 1980). Previous research has suggested that the RLSS is a solid instrument for sport leadership research (Zhang et al., 1996; Jambor & Zhang, 1997). The RLSS has 60 items broken into six subscales: 10 training and instruction behavior, 12 democratic, 8 autocratic behavior, 8 social support, 12 positive feedback, and 10 situational consideration behaviors.

1) *Training and Instruction.* This is planning training and evaluating performance, as well as being educated and being responsible. Coach self-evaluation has shown internal consistency at .84 (Jambor & Zhang, 1997) and .83 (Zhang et al., 1996).

2) *Democratic.* This is encouraging athlete involvement, confronting problems, and admitting wrongdoing. Coach self-evaluation has shown internal consistency at .66 (Jambor & Zhang, 1997) and .91 (Zhang et al., 1996).

3) *Autocratic*. This is independent thinking, using commands, and using punishments. Coach self-evaluation has shown internal consistency at .70 (Jambor & Zhang, 1997) and .35 (Zhang et al., 1996). Precautions should be taken when discussing the findings on the autocratic coaching style.

4) *Social Support*. This is helping athletes with personal problems and making the weight room experience an enjoyable part of the athlete's training. Coach self-evaluation has shown internal consistency at .52 (Jambor & Zhang, 1997) and .81 (Zhang et al., 1996).

5) *Positive Feedback*. This is positive encouragement after mistakes (healthy corrective behavior). Coach self-evaluation has shown internal consistency at .78 (Jambor & Zhang, 1997) and .85 (Zhang et al., 1996).

6) *Situational Considerations/Environment*. This is setting goals and differentiating coaching style based upon the maturity of the athletes and their skill levels. Coach self-evaluation has shown internal consistency at .69 (Jambor & Zhang, 1997) and .81 (Zhang et al., 1996).

A 5-point Likert scale was used to assess the percentage of time coaches perceived themselves to be performing the leadership behaviors [Always (100% of the time), Often (75% of the time), Occasionally (50% of the time), Seldom (25% of the time), Never (0% of the time)]. Responses were coded as follows: Always = 1, Often = 2, Occasionally = 3, Seldom = 4, and Never = 5. Each subscale was scored independently (Zhang et al., 1996).

Procedures

A Human subject's approval was gained through the process of an Institutional Review Board (IRB). To obtain data at the NBA level, the researcher first contacted an associate at this competitive level with both a phone call and follow up e-mail. Then a packet was sent to all NBA strength and conditioning coaches. The packet contained two letters. The first was a letter of introduction from the NBA strength coach that was printed on the official letterhead of NBA team. It introduced the sponsor strength coach, explained the researcher's previous experience in the field and asked for assistance in helping the researcher complete their Master's thesis. A second letter was included with the questionnaire packet that was written by the lead researcher. The letter explained the purpose of the research and the procedures for data collection. Mailing addresses for the envelopes were obtained from the official NBA website.

To obtain data at the two collegiate levels, a directory was obtained online which included links to the athletic websites of every Division I and Division II school that participates in athletics. An introductory e-mail was then sent out to each strength and conditioning coach listed in the athletic staff directory; it included the purpose of the research as well as the procedures for data collection. All coaches who were interested were instructed to reply with a mailing address, where after the questionnaire packet would be mailed to them. After contacting strength and conditioning coaches at all three levels, the participating strength and conditioning coaches were sent a large self-addressed stamped envelope (SASE) to return the filled out questionnaire. The envelopes

were mailed through the United States Postal System's 24-hour mailing kiosks. Upon opening the envelope, the first sheet was an informed consent waiver; upon return of the questionnaire the informed consent sheets were separated from the questionnaire packet. No information regarding the responses on the questionnaires was shared except with the lead researcher and the advising professors.

Second in the packet were the demographics and training methods questionnaires. Third was the RLSS questionnaire. The directions for the RLSS questionnaire were very clear and located at the top of each page (see Appendix A). For the RLSS, each participant was asked to answer every item with a truthful and spontaneous response.

Fourth, to ensure an optimal response from all three competitive levels, the data was collected during the off-season (the summer). During this summer period there was a higher likelihood of getting a response than during the spring or fall. This period should not affect strength and conditioning coach behavior styles (Beam et al., 2004). Regardless of competitive level, if after two months the packet was not returned, a second identical packet was mailed to the strength and conditioning coach.

Additionally, all the packet information had been coded to indicate to the researchers the competitive level of the participating strength and conditioning coach. Division I was marked with a "1", Division II was marked with a "2", and the NBA was indicated by a drawing of a star. Upon the envelopes return, the contents were separated into three distinct categories and stored in the sport psychology laboratory at the researcher's institution.

Statistical Design

Six one-way ANOVAs were completed for each of the six dependent variables (training and instruction, democratic, autocratic, social support, positive feedback, & situational considerations). The independent variable was the competitive level of strength and conditioning coaches: NBA, Division I, and Division II. In addition, frequency analysis was reported on participant demographics, job relevant information (i.e. total # of job moves), salaries, sources of information, training goals, training methods, attribution of athletic success to strength and conditioning, athletic testing methods, plyometrics, and training equipment.

Chapter IV

Results

This section will provide the results of: (a) Reliability of RLSS Scales, (b) Differences in Leadership Styles, (c) Strength and Conditioning Sources of Information, (e) Training Methods, (f) Plyometrics, and (g) Training Equipment.

Reliability of RLSS Scales

Some questions of the RLSS were adjusted slightly to reflect a weight room setting instead of an athletic setting. For example: “Put an athlete into different positions depending on the needs of the situation” was changed to: “Assign the athlete different exercises depending on the needs of the situation”. Reliability of the Revised Leadership for Sport Scale (Zhang, Jensen, and Mann, 1996) was tested in the current study for each of the six leadership styles. Cronbach’s Alpha for leadership was: .819 for democratic, .520 for autocratic, .813 for positive feedback, .831 for training and instruction, .724 for social support, and .741 for situational considerations.

All subscales demonstrated high reliability except for autocratic. Previous studies on both the RLSS (Jambor & Zhang, 1997; Zhang et al., 1996) and LSS (Chelladurai & Saleh, 1980; Horn & Carron, 1985; Salminen & Liukkonen, 1994, 1996; Weiss & Friedrich, 1986; Westre & Weiss, 1991) have found low reliability on the autocratic subscale. Caution should be taken when discussing the findings of this subscale. Table 4 shows the reliability of the RLSS compared to previous research done by Zhang et al (1996) and Jambor and Zhang (1997) on the athletic coaches’ self-evaluation version. This suggests that the RLSS as adapted for strength and conditioning coaches was a reliable measure.

Table 4

Reliability of Revised Leadership for Sport Scale: Coach Self-Evaluation

RLSS Subscale	Strength Coaches (Current Study)	Athletic Coaches (Zhang, Jensen, & Mann, 1996)	Athletic Coaches (Jambor & Zhang, 1997)
Democratic	.82	.93	.66
Autocratic	.52	.35	.70
Positive Feedback	.81	.85	.78
Training & Instruction	.83	.83	.89
Social Support	.72	.81	.52
Situational Considerations	.74	.81	.69

Differences in Leadership Styles between NBA, DI, & DII Strength Coaches

Before analysis on the differences between three types of strength and conditioning coaches were conducted, the researcher made two decisions. First, in order to make the number of participants more equal at each of the three levels, fifty participants were randomly removed from the DI competitive level, resulting in forty-two DI strength coaches, twenty-two NBA strength coaches, and thirty-one DII strength coaches. Second, an alpha level of .01 was used to protect against the violations of sphericity.

ANOVA results identified significance on five of the six subscales (autocratic, democratic, training & instruction, social support, and situational considerations). Only positive feedback did not show significance (see Table 5).

Table 5

ANOVAs for the Six RLSS Subscales

RLSS Subscale	<i>df</i>	error	F	R ²	p
Democratic	2	92	5.875	.113	.004*
Autocratic	2	92	8.714	.159	.000*
Positive Feedback	2	92	2.909	.059	.060
Training & Instruction	2	92	8.993	.164	.000*
Social Support	2	92	9.171	.166	.000*
Situational Considerations	2	92	24.630	.349	.000*

*Significance greater than .01.

Scheffe post hoc tests were conducted on the five significant leadership subscales. Results revealed NBA strength coaches self-reported higher democratic leadership style than DI strength coaches but no differences were found between NBA and DII strength coaches or between DI and DII strength coaches. DI strength coaches self-reported higher autocratic leadership style than DII or NBA strength coaches but no differences were found between DII and NBA strength coaches. NBA and DI strength and conditioning coaches self-reported higher training and instruction leadership style than DII strength coaches while NBA and DI strength and conditioning coaches did not differ. NBA strength and conditioning coaches self-reported higher social support than DI or DII strength coaches but DI and DII strength coaches self-reported social support style did not differ. Finally, NBA strength and conditioning coaches self-reported higher situational considerations than DI and DII strength coaches but DI and DII strength

coaches did not differ from each other. Table 6 presents means and standard deviations for each competitive level of strength and conditioning on each RLSS subscale.

Table 6

Means and Standard Deviations of RLSS Subscales by Strength Coach Competitive Level

RLSS Subscale	NBA		Division I		Division II	
	M	SD	M	SD	M	SD
Democratic	38.23 _a	7.95	43.67 _b	5.27	42.03	5.47
Autocratic	26.50 _b	3.80	23.45 _a	2.79	25.68 _b	2.82
Positive Feedback	17.77	5.67	20.20	4.96	21.45	6.03
Training & Instruction	13.32 _a	2.50	14.26 _a	3.32	18.23 _b	6.95
Social Support	16.5 _a	3.84	20.83 _b	3.99	19.84 _b	3.76
Situational Considerations	12.46 _a	2.48	17.41 _b	3.14	19.07 _b	4.35

Note: different subscripts indicated significant differences between means (lower mean scores indicates that the leadership style is perceived to be done more frequently)

Strength and Conditioning Coach Sources of Information

Table 7 indicates the primary source of information for all three competitive levels. Question #15 in the Demographics and Training Methods Questionnaire asked strength and conditioning coaches what sources (resources) of information were the most widely used to increase their professional knowledge. “Other coaches/programs” was the most frequently selected (whether it be first or third) for improving one’s knowledge base. The choices available to the strength and conditioning coaches were: Other coaches/programs, Books, Journals, Certification, Clinics, Conventions, Videos, Internet, Non-coaches (professionals in other fields), Personal Experience, Magazines, Studies, and Research Science. The ranking for selecting a source of information were: 1st, 2nd, or 3rd (most valuable / most used resource). A source of information left blank indicated it was not ranked in the top three.

Table 7

Strength & Conditioning Coach Primary Source of Information

Category	NBA (#)	Division I (#)	Division II (#)
<i>Coach/Other Programs</i>			
1 st	50% (11/22)	54.3% (50/92)	61.3% (19/31)
2 nd	4.5% (1/22)	15.2% (14/92)	25.8% (8/31)
3 rd	22.7% (5/22)	6.5% (6/92)	3.2% (1/31)

= Responding Number of Participants / Total Number of Participants

Strength and Conditioning Coach Training Methods

Question #16 on the Demographics and Training Methods Questionnaire asked strength and conditioning coaches what their main concern with regards to training goals were for strength and conditioning. The possible responses were: Injury Prevention, Increase Strength/Power/Mass, Enhance Performance, and Other. The goals were marked in terms of priority from 1st through 3rd. Injury prevention was the primary goal of nearly 60% of the NBA strength and conditioning coaches. Enhance performance was the second priority (50%) and increase strength/power/mass was the third priority (54.5%). Enhance performance was the primary goal of nearly 50% of DI and DII strength and conditioning coaches. Injury prevention was the second priority (41.3%) and increase strength/power/mass was the third priority (37%) of Division I strength and conditioning coaches. Increase strength/power/mass was the second priority (35.5%) and injury prevention was the third priority (32.3%) for Division II strength and conditioning coaches. Table 8 presents the strength and conditioning coach's goal for strength and conditioning.

Table 8

Goals of Strength and Conditioning

Category	NBA (#)	Division I (#)	Division II (#)
Injury Prevention			
1 st	59.1% (13/22)	32.6% (30/92)	35.5% (11/31)
2 nd	27.3% (6/22)	41.3% (38/92)	32.3% (10/31)
3 rd	13.6% (3/22)	23.9% (22/92)	32.3% (10/31)
Increase Strength/Power/Mass			
1 st	4.5% (1/22)	15.2% (14/92)	12.9% (4/31)
2 nd	18.2% (4/22)	25% (23/92)	35.5% (11/31)
3 rd	54.5% (12/22)	37% (34/92)	29% (9/31)
Enhance Performance			
1 st	36.4% (8/22)	45.7% (42/92)	48.4% (15/31)
2 nd	50% (11/22)	29.3% (27/92)	22.6% (7/31)
3 rd	9.1% (2/22)	18.5% (17/92)	19.4% (6/31)

= Responding Number of Participants / Total Number of Participants

The final question on the Demographics and Training Methods Questionnaire asked strength and conditioning coaches to what degree (percent) they attributed strength and conditioning to athletic success. The selections made available to the strength coaches were: < 25%, 25-50%, 50-75%, and >75%. In general, strength and conditioning coaches at all levels attributed anywhere from 25% to 75% of their athletes' success to strength and conditioning. More specifically, nearly 40% of strength and conditioning

coaches at each competitive level attributed 25-50% of the athletes' success to strength and conditioning. Table 9 details strength and conditioning coach attribution of training to athletic success.

Table 9

Strength and Conditioning Coach Attribution of Training to Athletic Success

Category	NBA (#)	Division I (#)	Division II (#)
Less than 25%	13.6% (3/22)	22.8% (21/92)	9.7% (3/31)
25-50%	40.9% (9/22)	45.7% (42/92)	38.7% (12/31)
50-75%	22.7% (5/22)	25% (23/92)	32.3% (10/31)
Greater than 75%	22.7% (5/22)	5.4% (5/92)*	19.4% (6/31)

= Responding Number of Participants / Total Number of Participants

* = Missing 1.1%

Strength and Conditioning Coach Athletic Testing

Athletic testing is the measuring of a specific component of an athlete that is considered to be a relevant to a particular aspect of athletic performance (i.e. body composition, strength, power, etc.) Question # 20 asked what types of athletic testing the strength and conditioning coaches performed with their athletes. The choices for athletic testing were: Acceleration, Agility, Anaerobic Capacity, Anthropometrical, Body Composition, Cardiorespiratory Endurance, Flexibility, Muscular Endurance, Muscular Power, Muscular Strength, Speed, and Other. Nearly 100% of NBA, DI, and DII men's basketball strength coaches performed some form of athletic testing. Muscular strength,

muscular power, agility and speed were highly tested across all three competitive levels. For each respective category the NBA was 77.3%, 63.6%, 81.8%, and 72.7%; DI was 92.4%, 84.8%, 87% and 72.8%; and DII was 77.4%, 58.1%, 77.4%, and 64.5%. In addition, more than two-thirds of NBA strength and conditioning coaches tested the variables of anthropometrical (body measurements such as skinfolds) (68.2%), flexibility (68.2%), and body composition (95.5%). Table 10 presents the notable athletic variables that were tested.

Table 10

Strength and Conditioning Coach Athletic Testing Variables

Category	NBA (#)	Division 1 (#)	Division 2 (#)
Acceleration	40.9% (9/22)	45.7% (42/92)	32.3% (10/31)
Anthropometrical	68.2% (15/22)	23.9% (22/92)	6.5% (2/31)
Flexibility	68.2% (15/22)	47.8% (44/92)	45.2% (14/31)
Muscular Strength	77.3% (17/22)	92.4% (85/92)	77.4% (24/31)
Agility	81.8% (18/22)	87% (80/92)	77.4% (24/31)
Body Composition	95.5% (21/22)	76.1% (70/92)	61.3% (19/31)
Speed	72.7% (16/22)	72.8% (67/92)	64.5% (20/31)
Anaerobic Capacity	63.6% (14/22)	64.1% (59/92)	12.9% (4/31)
Muscular Power	63.6% (14/22)	84.8% (78/92)	58.1% (18/31)

= Responding Number of Participants / Total Number of Participants

Strength and Conditioning Coach Use of Plyometrics

Plyometrics are exercises involving the rapid stretching and contracting of muscles (jumping) that are typically employed with strength and conditioning to improve muscular power. Question #21 asked what the strength and conditioning coach's main purpose was for using plyometric exercises with their athletes. The choices made available to rank were: Total Body Training, Lower Body Power, Upper Body Power, Speed Development, and Other. Over 90% of strength coaches at each competitive level put lower body power within their top three priorities. Speed Development was also shown to be an important purpose for plyometrics. Strength and conditioning coaches at the NBA and Division II level ranked it a second priority with close to 50% at each respective level while Division I strength coaches ranked it a second or third priority with each being close to 40%. Table 11 details the main purposes for NBA, DI, and DII men's basketball strength and conditioning coaches to use plyometric exercises.

Table 11

Strength and Conditioning Coach Purpose of Plyometrics

Category	NBA (#)	Division I (#)	Division II (#)
Lower Body Power			
1 st	54.5% (12/22)	62% (57/92)	35.5% (11/31)
2 nd	27.3% (6/22)	19.6% (18/92)	41.9% (13/31)
3 rd	13.6% (3/22)	12% (11/92)	16.1% (5/31)
Speed Development			
1 st	9.1% (2/22)	9.8% (9/92)	35.5% (11/31)
2 nd	45.5% (10/22)	33.7% (31/92)	41.9% (13/31)
3 rd	18.2% (4/22)	37% (34/92)	9.7% (3/31)

= Responding Number of Participants / Total Number of Participants

Questions #23 and #24 ask at what point in the season are plyometrics a part of the athlete's workout and when, during the workout, are plyometrics integrated into the strength and conditioning routine. The choices for question #23 were: Pre-Season, In-Season, Post-Season, Training Camp, and Year Round. Nearly 100% of NBA (95.5%), DI (98.9%), and DII (93.5%) strength coaches performed plyometrics exercises. The most frequently marked time to perform plyometrics exercises was during the pre-season (59.1% NBA, 64.1% DI, and 67.7% DII). Also marked, though not as highly as pre-season, was the post-season (50% NBA, 41.3% DI, and 67.7% DII).

For question #24 the choices were: Separate Days, Before Weights (same day), Complex Training, After Weights (same day), and Other. Complex training is performing a strength exercise and immediately following it with a plyometric movement (i.e. barbell back squats followed by plyo box jumps). The most common time to integrate plyometrics into a workout for DII strength coaches was separate days (54.8%). Table 12 states when the plyometrics were performed and when the plyometrics exercises were integrated into the strength and conditioning workouts.

Table 12

Strength and Conditioning Coach Performance and Integration of Plyometrics

Category	NBA (#)	Division I (#)	Division II (#)
Performance			
Pre-Season	59.1% (13/22)	64.1% (59/92)	67.7% (21/31)
Post-Season	50% (11/22)	41.3% (38/92)	67.7% (21/31)
Integration			
Separate Days	40.9% (9/22)	31.5% (29/92)	54.85% (17/31)
Before Weights (same day)	68.2% (15/22)	60.9% (56/92)	45.2% (14/31)
Complex Training	59.1% (13/22)	60.9% (56/92)	38.7% (12/31)

= Responding Number of Participants / Total Number of Participants

Strength and Conditioning Coach Equipment

Question #18 asked what specific strength and conditioning equipment was used by the strength coaches. Twenty choices were given: Dumbbells, Barbells, Olympic Platforms, Plate-loaded Machines, Pulley Machines, Theraband/Theratubing, Manual Resistance, Balance Disks/Airex Pads, Foam Rollers, Medicine Balls, Cones/Mini-hurdles, Agility Ladder, Cam-type Machines, Chains & Tires, Speed Equipment, Sandbags & Swiss Balls, and the VertiMax[©]. The VertiMax[©] is a machine designed to improve power output through the use of pulleys and resistance bands that are to be used in conjunction with plyometric exercises (i.e. squat jumps). It is primarily marketed as a device to increase the height of an athlete's vertical jump. Most notable among the findings were that across all three competitive levels, strength and conditioning coaches use dumbbells (over 95%) and barbells (over 95%), which are also called free weights. Also, more than 90% of NBA, DI, and DII strength coaches reported using medicine balls (95.5%, 97.8%, and 90.3% respectively) and over 80% of strength and conditioning coaches at each level reported using agility ladders (81.8%, 97.8%, and 80.6% respectively). Rarely used at all was the VertiMax (22.7% NBA, 28.3% DI, and 16.1% DII). Table 13 details the equipment used by strength and conditioning coaches.

Table 13

*Strength and Conditioning Coach Equipment**

Category	NBA (#)	Division I (#)	Division II (#)
Dumbbells	95.5% (21/22)	100% (92/92)	100% (31/31)
Plate-loaded Machines	59.1% (13/22)	67.4% (62/92)	67.7% (21/31)
Medicine Balls	95.5% (21/22)	97.8% (90/92)	90.3% (28/31)
Cam-type Machines	31.8% (7/22)	29.3% (27/92)	19.4% (6/31)
Barbells	95.5% (21/22)	100% (92/92)	96.8% (30/31)
Pulley Machines	86.4% (19/22)	77.2% (71/92)	77.4% (24/31)
Balance Disks	90.9% (20/22)	64.1% (59/92)	38.7% (12/31)
VertiMax©	22.7% (5/22)	28.3% (26/92)	16.1% (5/31)
Theratubing©	81.8% (18/22)	69.6% (64/92)	54.8% (17/31)
Foam Rollers	86.4% (19/22)	41.3% (38/92)	9.7% (3/31)
Agility Ladders	81.8% (18/22)	97.8% (90/92)	80.6% (25/31)

= Responding Number of Participants / Total Number of Participants

* = Includes Selected Notable Equipment Options, Not All Equipment Options.

Chapter V

Discussion

There is an old adage about the strength and conditioning of athletes that suggests three things an athlete should be (when compared to their opponent): bigger, stronger, and faster. What was true then (whenever that comment was first made) is still true today; however, the manner in which athletes are trained has evolved significantly. The world of athletics, whether at the DI collegiate level or professional level, is now a multi-million dollar business (or game). Also, day-to-day advances are made in the fields of exercise physiology, motor behavior, and sport psychology, and it is no longer an easy or efficient course of action for a coach to be proficient in both the athletic training and strength and conditioning of their athletes.

Along with physical education, there exists a more science-based field dedicated to enhancing and improving athletic performance that includes the aforementioned specializations such as exercise physiology and sport psychology. Therein is the importance of the strength and conditioning coach; the strength coach, no different than an athletic coach who draws up game plans and studies film of the opposing teams, studies and evolves their craft to enhance athletic performance through resistance training and conditioning protocols. Since the inception of the National Strength and Conditioning Association (NSCA) over twenty years ago, along with the gradual evolution and demand for a qualified “someone” to maximize athletic potential through gains in strength, size, quickness, agility, and power, the need for a strength and conditioning coach has become a more and more accepted norm at the collegiate and professional level.

The following section will discuss the demographic data findings, the reliability of the RLSS questionnaire, and how competitive level impacts the coaching leadership styles of NBA, Division I, and Division II men's basketball strength and conditioning coaches.

Demographical Comparison

Examining salary is important because it helps develop a picture of how competitive level correlates with pay scale. However, because no stats examining differences between the competitive levels were conducted on the data, only observational trends can be stated. To begin, the NBA average salary was greater than \$80,000 (81.8%) compared to \$40-49,999 (34.8%) for Division I strength coaches and \$30-39,999 (38.7%) for Division II strength coaches. At the DI level, 57.6% of the participants made less than \$60,000. For DII, 87.2% made less than \$60,000 and no DII strength and conditioning coach made over this number. Thus, the trend seems to be that the higher the competitive level the higher the salary. This might be the case because the organization or academic institution would only be able to pay the strength and conditioning coach a salary that is appropriately partitioned from the total pool of available money. For instance, at the Division II level the athletic department may only have a \$100,000 dollars to distribute amongst non-athletic coaching staff (i.e. athletic trainers, equipment managers, strength and conditioning coaches, etc.). On the other end of the spectrum, a competitive Division I program may have five times that amount to distribute amongst the individuals who are non-athletic coaching staff.

No previous data exists on NBA, DI, or DII men's basketball strength and conditioning coach salaries. However, similar trends in average salary have been shown with DI and DII football strength and conditioning coaches. Martinez (2004) found that the average yearly salary of a DI football strength coach was \$57,948 while the average football strength coach at the DII level averaged \$33,765, a difference of \$20,000. Compared to the current findings the average salary of a DI men's basketball strength and conditioning coach (\$40-49,999) was substantially less than a DI football strength coach ranging from \$10,000 to \$20,000 less per year. However, at the DII level, the salary of men's basketball strength and conditioning coaches (\$30-39,999) is comparable to the salary of DII football strength coaches.

Within the field of strength and conditioning, the top strength position (head strength coach) is usually reserved for the individual responsible for football; this position is traditionally the highest paid strength and conditioning position at the collegiate level. The comparison of results suggests that this statement may be true as DI men's basketball strength coaches made less than DI football strength coaches. It also reinforces the statement that the higher the competitive level the greater the salary because a DI men's basketball strength coach earns on average, more than or the same amount as a DII football strength coach. And since the football strength coach is usually the highest paid, if competitive level were not a factor in determining salary, the football strength coach at a Division II athletic program would earn more than a Division I men's basketball strength and conditioning coach.

When examining ethnicity, an overwhelming majority at all three competitive levels were male and Caucasian, suggesting that competitive level plays little role in these areas. Strength and conditioning coaches at all three competitive levels might be predominately Caucasian due to nationwide college demographics. For instance, if Caucasians comprise a larger volume (or proportion) of the nationwide student body and almost all strength coaches, regardless of competitive level, have at least a bachelor's degree (for all three competitive levels only a single strength coach reported not having a college degree), then the pool of potential strength and conditioning coaches would be the greatest for the Caucasian majority.

Also, the data (not statistically examined) revealed NBA strength and conditioning coaches were shown to be older ($M = 40.23$) than Division I ($M = 32.89$) or Division II ($M = 34.23$) men's basketball strength and conditioning coaches. NBA strength and conditioning coaches had also spent more years as a full-time strength and conditioning coach and more years in their current position than Division I or Division II strength and conditioning coaches. The mean current position number of years for each level was NBA ($M = 7.55$), DI ($M = 4.52$), and DII ($M = 3.42$).

Therefore, since NBA strength coaches are more experienced (and therein older) than DI and DII strength coaches it suggests that age and experience may play a role in them getting a job at the highest competitive level of men's basketball. As well, the NBA strength coaches maintained their respective positions the longest, which may mean that once they are at the NBA level they have good job security (maintaining a job in the NBA).

What the data suggests about DI strength and conditioning coaches is that they have a higher turnover rate, which could possibly be due to their own choice (i.e. better job offer at another school) or by circumstances regarding their athletic program (i.e. football coach is fired and the new coach wants to bring in their own strength and conditioning coach). For DII strength coaches, the data may be suggesting that coaches at this competitive level have the strength and conditioning role added to their existing role as an athletic coach.

In terms of education, a majority of strength and conditioning coaches at the NBA (59.1%) and Division I (76.1%) level had a master's degree. Division II was evenly split between bachelors and masters with 48.4% possessing each. Yet, when asked what field the degree was in, only 51.6% of the DII degrees were in a human performance related field such as kinesiology or exercise science. This is in sharp contrast to the NBA and DI strength coaches who reported 95.5% and 91.3% respectively. One possible explanation for this disparity could be that NBA and DI strength coaches seek to primarily (and only) be a strength coach. Another reason for the disparity might be that DII coaches double as strength and conditioning coaches, but it was not their primary purpose for getting involved with intercollegiate athletics. Thus, their degree reflects their interest at the undergraduate level and not necessarily the desire to pursue a future career in that field (i.e. history or philosophy).

This possibility is suggested because of prior strength and conditioning experience and job roles. First, NBA and DI strength coaches, especially DI, are shown to have been graduate assistant strength coaches (40.9% and 61.9% respectively) much

more so than DII strength and conditioning coaches (16.1%). DI strength coaches also had a large majority having been volunteer strength coaches (75%). Second, a majority of NBA (68.2%) and DI (81.5%) strength coaches do not have another role. At the DII level, only 19.4% do not have another role with 67.8% being an athletic coach (head coach 22.6% and assistant coach 45.2%). It would appear that most DII strength coaches are athletic coach's first and strength and conditioning coaches second. Finally, more NBA (86.4%) and DI (97.8%) strength and conditioning coaches were certified than DII strength coaches (54.8%), which would seemingly relate to the aforementioned differences in educational background/emphasis and job roles. The National Strength and Conditioning Association-Certified Strength and Conditioning Specialist (NSCA-CSCS) was the dominant certification with the NBA (68.2%), DI (78.3%), and DII (38.7%). Prior research (Martinez, 2004) on collegiate football strength and conditioning coaches has shown this to also be the most referenced certification with DI football strength coaches (72.5%) and DII football strength coaches (69.51%). One explanation for the difference in certification between DII basketball strength coaches and DII football strength coaches is the perceived necessity of strength and conditioning for their athletes. It was already found that at the DII level, only 19.4% of basketball strength coaches do not have another role. This suggests that strength and conditioning for men's basketball at the DII level, although important, is not held at the same level of priority for giving their athletes the competitive edge as it might be held with DII football. That, and the coaches, given their multiple roles, may not deem it necessary to get certified in order to validate the strength and conditioning program to their athletes.

RLSS Reliability

Prior to analyzing the data from the current study, it was crucial to confirm the reliability of the RLSS on this sample of NBA, Division I, and Division II men's basketball strength and conditioning coaches. This study extends the reliability of the coach self-evaluation version of the RLSS as a measure of leadership style as five of the six subscales had good reliability (see Table 7) and demonstrates that this measure can be used to evaluate strength and conditioning coaches' self-evaluation of leadership. The only variable that did not test high enough was autocratic; however, the autocratic behavior has not consistently tested over .70. Jambor and Zhang (1997) found .70 reliability on autocratic leadership styles when examining differences in leadership styles between 162 coaches from the junior high, high school, and college level (sport was not specified by the researchers). However, only a .35 alpha level was obtained in a study by Zhang, Jensen, and Mann (1996) that included 206 intercollegiate coaches from a variety of sports in New England. Thus, it tells us that caution should be used when examining the results from the autocratic subscale of the RLSS because if these keep showing autocratic as low, the phrasing of the autocratic questions may be confusing and/or there may be low applicability of the questions for the coaches to their real life situations which results in an inaccurate representation of autocratic leadership style.

Comparison of Strength & Conditioning Coach Leadership Styles

The primary purpose of this study was to examine whether differences exist in six self-reported leadership styles of NBA, DI, and DII strength and conditioning coaches. The hypothesis was that there would be differences in strength and conditioning coach leadership behaviors at each of the three competitive levels (NBA, DI, & DII).

On the democratic leadership subscale, NBA strength coaches evaluated themselves as being more democratic than Division I strength coaches. However, no difference was found between NBA and Division II or Division I and Division II strength and conditioning coaches. There are several possible reasons for these findings.

First, NBA strength coaches may have evaluated themselves higher than DI strength coaches on democratic leadership (i.e. giving athletes input on training methods, intensity, etc.) because it fits the profile of the athletes they train better. At the NBA level, where there are high prices and highly priced egos, the strength coach must be careful to manage both what is necessary for strength training along with what is required to satisfy the athletes. Second, given the elite level of the NBA as well as the relatively small number of players the NBA strength coach is accountable, it would make it easier for them to allow NBA players the opportunity to provide more input and make training more specific to their needs.

Third, the job security of the NBA coach revolves around meeting the needs of the NBA players. For example, the owner would be likely to fire a strength and conditioning coach who has injured a player with a \$10 million contract than a DI or DII athletic director would be to fire a collegiate strength and conditioning coach who injured a basketball player. In contrast to the NBA strength coaches, DI strength coaches cannot so myopically channel their energy to accommodate every athlete and every situation because often times they are training athletes in a variety of sports as well (i.e. golf, soccer, or tennis). At the Division I level, athletes do not typically have as much authority in dictating weight room policy as an athlete who is being paid millions of dollars per year.

An interesting finding was the similarities between the NBA and DII strength and conditioning coach on the demonstrative leadership subscale. The similarity here, unlike the DI strength coaches, may be that because so many DII strength coaches are also athletic coaches they do not feel as authoritarian in this realm. This is perhaps because of a lack of experience or expertise. It is also possible that DII strength and conditioning coaches feel it is the best way to increase athletic motivation, adherence, and team chemistry. For instance, a coach might feel that because their weight training facilities are not the best and because they lack a lot of equipment for strength training, that the athletes might more likely take pride in their workouts if they have input.

On the situational considerate subscale, NBA strength coaches evaluated themselves as being more situational considerate than Division I and Division II strength coaches. A strength and conditioning coach who is situational considerate is someone who is able to adapt to their environment. For instance, upon seeing how exhausted the athletes are returning from a road trip, the strength coach alters the intensity of the strength and conditioning routine and includes a longer warm up and stretching session to assist the athletes in their recovery process. As noted above, a primary rationale for NBA strength coaches may be job security—meeting the demands of their athletes in every situation. Another example would be creating a different routine for a veteran player that varies from what the rookies or less experienced athletes perform and within it, incorporating exercises which the veteran player has expressed the enjoy performing. In addition, adaptation and flexibility are more pertinent to job security at the highest competitive level (NBA) than the Division I or Division II level due to the nature of their athletes and their athletic circumstances within which they are trained. However, it is

important to note that situational consideration was highly important at all levels as means ranged from 12.46 to 19.07. Examples at the Division I or II level would be similar to those at the NBA level. Similarly, you would have a strength and conditioning coach modifying the training program based upon the athlete's competitive game schedule or have a strength coach creating different routines based upon the athlete's lifting experience (i.e. freshman versus senior). The purpose of the dichotomy between the competitive levels is to show statistical differences; it does not suggest that only NBA strength coaches were situational considerate.

On the training and instruction subscale, NBA and Division I strength and conditioning coaches rated themselves higher than Division II strength and conditioning coaches. One possible reason may be that NBA and Division I strength coaches have more experience, strength and conditioning related education, and/or skill than their Division II counterparts. For example, the collected data shows higher frequency of NBA and DI strength coaches have at least a bachelors degree in a human performance related field (and typically a masters degree), more strength and conditioning certifications, and more strength training job experience. Also, more NBA and DI strength coaches cite that they are primarily a strength coach with no other job function (NBA = 68.2%, DI = 81.5%,. and Division II = 19.4%). Therefore, another possibility is that because they have more job-related education and experience with strength and conditioning, NBA and D I strength coaches can partake in more training and instruction behavior.

There was no difference between NBA and Division I strength coaches on training and instruction. An explanation for this may lie with similarities in experience,

education, skill, job role (strength and conditioning being their primary and/or only role) as well as the higher competitive level. The professional ranks is the highest level of competition, yet within the collegiate ranks, Division I is the highest level of competition. Each is the highest level in their respective category. For instance, with soccer in Europe there are different levels of professional soccer ranging from the lowest (3rd Division) to highest (Premiership). There are other non-collegiate professional basketball options apart from the NBA (such as Europe), however, the NBA is the highest level (the Premiership for basketball). Thus, there might be a connection between high levels of competition and training and instruction expectations and that, regardless of category (professional, college, club, etc.) there will be similarities in training and instruction based upon how high the level of competition is for their respective category.

Note however, that all rated training and instruction as very important. This suggests that though there are statistical differences, in reality, strength coaches at all competitive levels value training and instruction when training their athletes. In adopting this leadership style, it may allow the best opportunity for their athletes to improve their athletic skill, which in turn should then lead to enhanced athletic performance (both with strength and conditioning and athletic performance). It also increases safety and reduces the likelihood of athletic injury. For instance, an athlete who is properly coached and monitored as they perform a barbell squat will have a substantially decreased chance of poor form (i.e. rounded back) and athletic injury (i.e. herniated disk).

On the autocratic subscale, DI strength and conditioning coaches evaluated themselves significantly higher than NBA or DII strength coaches while the NBA and Division II strength coaches were not shown to have significant difference. One

explanation for this might be that at the elite level of the NBA, there is more than likely a lot of self-determination and intrinsic motivation by the athletes. A coach who is high in autocratic has been shown to undermine intrinsic motivation and create an atmosphere that is not conducive to facilitating perceptions of self-determination (Amorose & Horn, 2002; Hollembeak & Amorose, 2005). A second explanation is that at the elite level the atmosphere may remain highly competitive but may also shift to be more accommodating to the athletes because of the business-like nature of the elite level. In order to sell seats, win championships, etc. there is a necessity for team's to have chemistry and a large pool of talent. To keep this pool together, especially upon success, certain concessions are more likely to be made (where a substantial amount of money is involved) than at the other competitive levels. Division I strength coaches are likely the most autocratic because they have more than one team to manage and cannot take everyone's opinion into consideration from each team they coach. They must efficiently manage their time and know better than the athletes what needs to be done and how to effectively accomplish it. Also, they might perceive it as too difficult to get a consensus (since they are working with groups instead of individuals like at the NBA level). So, instead of a variety of opinions there is one—their opinion.

Also, one possible explanation for the difference between DI and DII strength and conditioning coaches may be a matter of job roles and experience. It was found from the demographic information that DII strength and conditioning coaches typically have more than one role (most commonly an assistant or head basketball coach) and are less experienced in strength and conditioning with education, professional experiences (i.e. internships), or both. Thus, though a DII strength coach may be more autocratic if they

have a primary athletic coaching position such as an assistant or head basketball coach, they may be less autocratic in their strength and conditioning role because it is a secondary emphasis for them. That, or because of their lack of professional training and education, they do not adopt as much of an authoritative leadership style as would a DI strength and conditioning coach who has only one job and background to support them only being a strength and conditioning coach.

On the social support subscale, NBA strength and conditioning coaches reported higher social support than DI or DII strength and conditioning coaches. For instance, social support would be involving themselves in personal matters in the athlete's life that do not involve strength and conditioning (i.e. mentoring or discussing family matters). One possible explanation may be that at the Division I and Division II competitive levels, strength and conditioning coaches have too many athletes (including other sport teams) to become particularly involved with social support. A simple numbers example would be that an NBA strength coach may be responsible for 5-15 athletes while a DI strength coach for men's basketball might have 15 basketball players but then also be responsible for the athletes on several other teams. This could possibly bring their total athlete pool to 50 or more athletes.

A second explanation may be that they do not want to get too personally involved with their athletes for discipline reasons (wanting to keep the divide between coach and athlete). They may feel they can be supportive of the athlete (such as attending games) and develop rapport this way without having to know the intimate details of their athlete's life. However, this statement is made with caution because even though the

NBA reported higher social support than DI or DII strength and conditioning coaches, all three were high on the social support subscale with means ranging from 16.5 to 21.7.

In possible contrast to DI and DII athletic settings, the NBA may be a more intimate and close-knit environment and therefore the NBA players may feel more comfortable talking about their life with strength coaches. The strength and conditioning coach may engage in more socially supportive behavior like going to lunch with the athletes or helping the athlete with a problem (i.e. helping a rookie find a house or apartment) because it helps solidify their relationship with the athlete. In addition, the strength coaches might recognize that is what the situation requires for optimal effort during weight training. One possible reason for there not being a difference between DI and DII strength coaches is the similarity of the collegiate atmosphere. Despite differences in competitive level, collegiate strength coaches adhere to similar social support styles based upon the college environment which, along with NCAA rules, may inhibit them from being too involved with the personal lives of their athlete (i.e. coaches may only spend so much time with their athlete and coaches may not purchase meals for their athletes outside of the season where there are travel expenses).

On the positive feedback subscale, there was no difference between NBA, DI, or DII strength and conditioning coaches. This suggests that positive feedback, such as verbally reinforcing an athlete after a good training session, is valued equally among the three competitive levels. The means for positive feedback ranged from 17.8 to 21.5.

Positive feedback has also been shown to be a common dimension affecting athlete's satisfaction (Chelladurai, 1984). In fact, positive feedback can spur positive emotions which can "(a) broaden people's thought-action repertoires, (b) undo lingering

negative emotions (Fredrickson & Levenson, 1998; Fredrickson, 2002), (c) fuel psychological resilience (Tugade & Fredrickson, 2004; Tugade, Fredrickson, & Barret, 2004), and (d) build psychological resilience and trigger upward spirals toward enhanced emotional well-being (Fredrickson & Joiner, 2000; Fredrickson, 2001). Therefore it may be that strength and conditioning coaches at each competitive level would give a considerate amount of positive feedback, not only to enhance athlete satisfaction, but to increase an athlete's positive emotional state while decreasing their negative emotional state—all of which may lead to enhanced performance.

Exploratory Research Findings

Purpose of Training. Injury prevention was rated 1st by 59.1% of the NBA strength coaches. Enhance performance was rated 2nd most important by 50% of the NBA and increase strength/mass/power was rated 3rd most important by 54.5% of the NBA strength coaches. One possible explanation for this might be that NBA strength and conditioning coaches are working with the highest skill level of basketball players. Many of the NBA players may be gifted athletically and therefore, the main emphasis of strength and conditioning is not as much getting them stronger and more powerful as much as it is keeping them as strong and as powerful as they currently are in the league. Another possibility may be job security. Training the NBA athletes to be bigger, stronger, and more powerful may increase (by virtue of the exercise selection) the chance of athletic injury. Thus, though improving performance and getting the athletes bigger and stronger is important, it does not outweigh the benefits of keeping the players injury free and maintaining what strength and power they currently possess.

The strength and conditioning coaches were given several choices for what the most important purposes are for strength and conditioning. Each purpose variable was included with three choices which ranged from 1st most important to 3rd most important. The strength and conditioning coaches were then able to rank each variable according to their training beliefs (i.e. injury prevention as 1st and enhance performance as 2nd). Division I strength coaches had enhance performance ranked 1st with 45.7% selecting it as their top priority. Injury prevention was ranked 2nd most important with 41.3% of the DI strength coaches selecting this variable as the next most important priority. Increased performance may be the primary selection by Division I strength and conditioning coaches because the coaches at their competitive level want their athletes to do strength and conditioning to improve their performance first and, if injury prevention is included with the strength training, it is a bonus feature of the routine.

For instance, a freshman basketball player is assigned to a strength coach and the athletic coach quite likely does not want this athlete to get injured (train to prevent or lessen the chances of injury), but they also want this athlete to be playing (possibly starting for them one day). The athletic coach then would probably want, as may be the situation with a majority of Division I basketball programs, the athlete to do strength and conditioning to improve their performance (whether it is greater strength, quickness, power, etc.). This would then dictate to the emphasis prescribed in the Division I strength coach's strength and conditioning routine.

Nearly half (48.4%) of the DII strength coaches ranked enhance performance as their 1st priority for strength and conditioning. Ranked 2nd was increase strength/power/mass with 35.5% of DII strength coaches selecting it as their next most

important priority purpose. The most ranked 3rd variable was injury prevention; 32.3% of DII strength coaches selected it as the 3rd most important purpose for strength and conditioning. To some extent, all strength and conditioning is injury prevention but for the purposes here, the difference with DII and NBA but similarity with DI is based on competitive level and the ability to work more intricately with athletes. The athlete needs are drastically different from the NBA to DII because the quality of athlete is so different. Thus, where the athletes at the DII level may need to train to specifically enhance performance, athletes at the NBA level may be so genetically gifted that the focus shifts to maintaining current fitness levels and preventing injury. And, when considering injury prevention, DII strength coaches may not be able to specifically tailor a routine for injury prevention with physical therapy exercises and higher volume / lower resistance training (such as is done with tubing and bands) because of a lack of knowledge (education and experience) or a lack of time to specialize each athlete's routine, which would not be a problem at the NBA level.

Sources of Information. Four important points were found. First, the primary source of information for NBA, DI, and DII men's basketball strength and conditioning coaches was "Other Strength Coaches" (50%, 54.3%, and 61.3% respectively). When including the possibility of "Other Strength Coaches" being marked as a 1st, 2nd, or 3rd most important option its cumulative scores were 77.3%, 76.1%, and 90.3% for NBA, DI, and DII men's basketball strength coaches respectively. No other sources of information were remotely close to a majority. Regardless of competitive level then, it appears that within the field of strength and conditioning there may be a tight "bond" or "network" amongst the coaches wherein they seek out those who share their profession first and

foremost and look to “outsiders” afterward. One example of this may be the Collegiate Strength & Conditioning Coaches Association (CSCCa) which requires a nine month mentoring process beneath a veteran strength and conditioning coach in order to be certified and thus, as a result of this process, appears to foster and/or promote “in-house” guidance to strength and conditioning questions.

Second, a strength and conditioning certification was almost never marked as a source of information. Only 4.3% of DI (the NBA and DII were at 0%) put it in the top three. This suggests that the certification may be more of a resume builder than an educational tool.

Third, very few strength and conditioning coaches put scientific journals in their top three. Of the participants in this study, strength and conditioning coaches reported not using scientific journals (77.3% NBA, 75% DI, and 67.7% DII). The reliability and applicability of the scientific journals to the professionals in the field could then be called into question, since theoretically, a sound program design should be based upon strong science. Strength and conditioning coaches at all three competitive levels may believe that the research within the journals is not applicable enough to their applied setting. There may also be a bias against researchers by strength and conditioning coaches, where because the researchers are not practicing strength and conditioning coaches, current strength and conditioning coaches do not value their strength and conditioning advice as much as they do from a non-peer reviewed source like other coaches.

Finally, professionals in the field rarely used strength and conditioning videos. No one in DII watched instructional videos. Only 5.5% watched videos at the DI level and 13.6% at the NBA level. This brings into the question the lucrative nature of the

video business and may suggest that videos are done for other reasons than technical instruction (such as a resume builder or a self-promotional tool). That, or after being trained they may not feel a need to learn new exercises and if they do, they may choose to ask a colleague rather than watch a video.

Training Methods. Four training methods are of note. First, about 50% of NBA and DII strength and conditioning coaches say that strength and conditioning contributes to more than 50% of their athlete's success while only about 30% of DI strength and conditioning coaches attribute this much. This finding is unexpected, as the researcher would have assumed that at DI levels the strength and conditioning coaches would have believed they could have had a greater impact on athletic performance because they can refine a raw, high school athlete. One possible explanation for this is that the sport in question is basketball. Strength and conditioning may not be as highly an emphasized point of athletic performance as it might be with football. Also, DI men's basketball strength and conditioning coaches may also believe that other factors contribute more so to athletic success than their training methods. For instance, variables such as highly skilled recruits (i.e. ability to shoot extremely well even if they are not the strongest player on the court) and highly skilled coaches (i.e. good scouting and intense and effective team practices) may contribute more to athletic success at the DI level than strength and conditioning. It is not unexpected at the NBA level, as the NBA strength coaches may perceive their emphasis on "injury prevention" greatly contributing to the NBA player's athletic success. Regardless of the competitive level, strength and conditioning professionals seem to view their training as an integral reason (at least a 25%) the athletes they work with are successful in basketball.

Second, the two most notable frequencies in training methods were found in training to failure and mimicking skilled movements. Only the DI strength coaches trained athletes with workout sets to failure, which is performing an exercise to the point of complete muscular fatigue wherein no more reps can be completed for that set. It is commonly done with fundamental exercises such as squats and bench press. Given that Division I strength coaches indicated their primary goal for strength and conditioning was “enhancing performance” this may mean that DI strength coaches perform lifts/exercises that physically tax the athlete to the point of complete muscular fatigue (i.e. bench press to failure or sit ups to failure).

For mimicking skilled movements, which is performing a strength and conditioning exercise that parallels an actual sport movement, only the NBA had a majority (72.7%) of strength and conditioning coaches doing such training. DI strength coaches were 41.3% and DII were 45.2%. This might mean that NBA strength coaches feel their athletes have the “basics” down and therefore focus on specialization and refinement particular to the needs of the competitive situation. 59.1% of NBA strength coaches ranked injury prevention as their 1st most important priority for strength and conditioning. This suggests that they perceive mimicking skilled movements as an excellent way to train athletes in sport specific movements that will have greater carry-over to game situations and therein decrease the likelihood of athletic injury. They may also have more time and resources available to them, which would then allow NBA strength coaches to more easily train basketball specific movement patterns.

Third, over 90% of all strength and conditioning coaches at the NBA, DI, and DII level periodize their athlete’s routines. This agrees with the previous NBA data where

Simenz et al (2005) found almost all NBA strength and conditioning coaches (90%) periodized their routines. To periodize a routine means to plan and vary the training load/program at regular time intervals in order to achieve optimal gains in physical performance. This definition then also serves as the likely reasoning for why so many strength coaches at each competitive level employ periodization—to strategically maximize gains in physical performance.

Fourth, while in-season, the most common amount of workouts per was two-days per week at all 3 levels [(NBA (50%), DI (65.2%), and DII (64.5%)]. When this is increased to include 2 or 3 days per week, the consistency among competitive levels increased dramatically—NBA (100%) DI (94.5%), and DII (93.5%). The duration of the bi-weekly sessions was also similar, being around 30 minutes or just slightly over this half-hour marker. The off-season duration that was most commonly given was 4 days a week (59% NBA, 45.7% DI, & 54.8% DII) with a duration of 60 minutes or slightly over the hour mark.

Further, regardless of the professional sport (NFL, NHL, MLB), the typical off-season weight-training program is 4 days per week and between 45-75 minutes while in-season lifting is confined to 2 day per week and around 30 minutes (Ebben & Blackard, 2001; Ebben et al., 2004; Ebben et al., 2005; Massey et al., 2005; Simenz et al., 2005). This frequency and durations seems to be across the board for all professional sports as well as Division I and Division II men's basketball. This suggests several things. First, duration and frequency of sessions appears to be common ground regardless of competitive level, suggesting that during the in-season, when there is less time available

for strength and conditioning, 2 days per week for around 30 minutes is the typical time afforded to achieving the in-season training goals. Second, these variables increase as the focus in the off-season changes away from athletic competition and toward preparation for the following season.

Type of Athletic Testing. There were five important findings, the first of which was that athletic testing, which is examining performance variables that may then be compared to norms in order to evaluate athletic performance, was done nearly 100% of the time by strength and conditioning coaches at all competitive levels surveyed. This suggests that athletic testing is a critical component of strength and conditioning, most likely allowing the strength coach to determine the individual and team needs of their respective athletes and sport. This data is also consistent with prior data regarding the NBA, which found that all (100%) of NBA strength and conditioning coaches tested their athletes (Simenz et al., 2005).

Second, NBA strength and conditioning coaches were found to test anthropometrical, which is measuring limb circumference (68.2%), flexibility (68.2%), and body composition (95.5%) with the highest frequency. This is congruent with data by Simenz et al (2005) that had NBA strength coaches testing anthropometrical (60%), flexibility (75%), and body composition (95%). Such testing is likely done with the greatest frequency at this competitive level because of fewer time restraints (they have only their athletes to consider) and fewer athletes (they are responsible for only 1 team). NBA strength coaches are, because of their highly specialized role, able to test more variables with greater frequency (and monitor changes in these variables over time) than a DI or DII strength and conditioning coach would be able to test (and monitor).

Third, DI strength coaches tested strength (92.4%) and power (84.8%) with the greatest frequency. This suggests that strength and power may be the two most important athletic components for DI men's basketball players and that DI strength and conditioning coaches need to be able to effectively test these components because they may relate the most to strength and conditioning goal of enhancing athletic performance. NBA strength coaches may test these less because of program emphasis (injury prevention) and the already elite caliber of athlete they are working with (not much room for physical improvement) whereas DII strength and conditioning coaches may test these less because of facility constraints or strength and conditioning coach experience with such testing protocols.

However, the percentages for power at each competitive level (NBA 84.8%, DI 63.6%, & DII 58.1%) are lower than expected considering how great a number of strength coaches report performing power oriented exercises such as Olympic lifting (81.8% NBA, 89.1% DI, and 58.1% DII), plyometrics (95.5% NBA, 95.7% DI, and 93.5% DII) and explosive movements (95.5% NBA, 91.3% DI, and 80.6% DII). A lack of financial resources could explain the power percentage at the DII level doing Olympic lifting since only 51.6% have Olympic platforms.

Incidentally, since plyos are considered explosive, it is odd that 80.6% of DII strength coaches marked "explosive movements" within the category of specific training methods while a much larger percentage (93.5%) indicated they did plyos. Either there was a misinterpretation of the question or confusion as to what constitutes an explosive exercise.

The fourth important finding was agility and its connection to acceleration testing. Agility tested over 75% for all three competitive levels. Yet, acceleration, which should go seemingly hand-in-hand with agility because of the advantage that is had in being able to get up to speed over a short distance, was tested below 50% by strength coaches from all three levels.

Fifth, both the NBA and DI have a majority testing anaerobic and much smaller minority doing aerobic testing or cardiovascular testing, which is important considering how the basketball is much more anaerobic than aerobic (Tavino, Bowers, & Archer, 1995). Incidentally, nearly half (45.2%) of DII strength coaches tested aerobic capacity but only 12.9% tested anaerobic capacity. This suggests that DII strength coaches have a different philosophy regarding the nature of men's basketball (that it is more aerobic than anaerobic), that they do not know how to effectively test anaerobic capacity, or that because of differences in education and strength and conditioning experience between DII strength coaches and NBA and DI strength coaches, DII strength coaches do not understand the sport specific conditioning requirements of men's basketball.

Plyometrics. There were five important findings regarding plyometrics exercises, which are known for emphasizing the stretch shortening cycle along with being a well established way to increase ground reaction forces and speed of movement (Chu, 1996). First, the primary purpose of plyometrics was determined to be developing lower body power. At the NBA level, 54.5% of the strength coaches put this first and only 4.5% did not put this in their top three. This number was higher at the DI level, with 62% of the coaches indicating lower body power as their primary plyo objective and only 5.4% not

putting this in their top three. At the DII level, lower body power was tied with speed development at 35.5% a piece. Only 6.5% of DII did not put lower body power in their top three. This suggests that for basketball, lower body power is the primary reason for executing plyometric drills although there is not a research data consensus on the overall benefits of plyometrics improving lower body (jump) power (Lundin and Berg, 1991).

Speed development was also marked as highly important at all three levels. In the NBA, only 27.3% did not mark speed development as one of the top three sources while only 18.5% of DI and 12.9% of DII strength coaches did not mark it. Considering how plyometrics may be better suited for developing speed of movement over power it makes sense that speed development should be in the top three, if not the primary reason. This means that NBA, DI, and DII strength coaches may perceive plyometrics as primarily a means to improve lower body power (vertical jump height) instead of a means of increasing the speed of the jumping movement (how fast they perform the jumping movement) despite insufficient data to conclusively say it definitely does improve muscular power (Williams, 2001).

Second, it was previously found that the two most common times for plyometrics to be done amongst NBA strength coaches were pre-season (40%) and postseason (35%) (Simenz et al., 2005). The current study found pre-season to be marked by 59.1% of the NBA strength coaches and post-season marked 50%. In both studies, in-season was not marked by a high majority of NBA strength coaches, indicating that the time to train and peak the athlete's power was prior to the start of the season, initiating the plyometric exercises in the post-season and culminating them in the pre-season.

Third, the most common times to perform plyometrics was either in-season or post-season and of those two, in-season was most commonly marked by all three competitive levels (59.1% NBA, 64.1% DI, 67.7% DII). However, DII strength coaches split from NBA and DI strength coaches at when was the most relevant time to integrate plyos into workout. The highest for DII was on separate days (54.8%). Before weights was marked by 68.2% of the NBA and 60.9% of DI while complex (within the workout) was marked by 59.1% of the NBA and 60.9% of DI. This suggests that NBA and DI strength coaches may either use plyometrics before or during their workout, but do not typically set aside a day specifically for plyometrics and not weight training. The reason behind this may be a time management issue, where instead workout content is massed to several days per week instead of distributed over every day during the week (not including the weekend). It is not clear why DII strength and conditioning coaches would prefer to do plyometrics on separate days from strength training.

Fourth, prior data on NBA strength and conditioning coaches reported the number who performs plyometrics at 100% (Simenz et al., 2005) In the current study this dropped 4.5% to include all but one NBA strength and conditioning coach. From this data it is clear that plyometrics are an important component of strength and conditioning at the NBA level. This is likely in part due to specificity of training methods and a correlation between the explosiveness of plyometrics and the explosive athletic requirements of NBA athletes.

Fifth, is previously the most common time for an NBA strength and conditioning coach to integrate plyometrics into a workout was complex training (60%), separate days

(45%), or before weight training (45%) (Simenz et al., 2005). Findings in the current study were similar on complex training (59.1%) and separate days (40.9%). However, more NBA coaches in this study reported doing plyos before weight training (68.2%). Despite this difference, the point to be taken from this is that plyometrics are most often incorporated into a workout either prior to lifting, in alternation with weight training (complex), or on days where there is no weight training.

When the plyometric exercises are done is up to the discretion and professional judgment of the NBA strength and conditioning coach. Although, in more specific terms, an NBA strength coach might perform the plyometric exercises before weight training or on off-days because the athlete's muscles would be more rested and the central nervous system would be more responsive, therein allowing the athlete to be more explosive. For the complex training, that of alternating weight training with plyometrics, one explanation would be the strength coach wanting to increase muscle fiber recruitment and increase the responsiveness of the central nervous system in order to maximize explosive power output during the execution of a plyometric exercise.

Equipment. There are three points of interest when considering equipment. First, NBA strength and conditioning coaches used balance disks/Airex pads (90.9%), Theratubing[®]/Therabands[®] (86.4%), and foam rollers (86.4%) with the highest frequency. DI strength coaches used them 64.1%, 69.6%, and 41.3% while DII strength coaches were 38.7%, 54.8%, and 9.7% respectively. This makes sense for two reasons: program emphasis and program budget. Balance disks, tubing, and foam rollers are primarily used for preventative rehabilitation exercises where emphasis is not on massive

gains in strength and power, but on decreasing the likelihood of injuring a specific muscle (i.e. rotator cuff) or muscle group (i.e. posterior chain). The NBA was shown to have the primary goal of strength and conditioning as injury prevention, which is reinforced by their equipment selection. Another possibility is that these items may not be as prevalent with DI and DII strength and conditioning coaches because of equipment budget. Strength coaches at each competitive level may have only a small amount of money allocated each year to equipment purchases and as a result, the above three are not a priority because of cost relative to benefit or cost relative to the emphasis of the strength and conditioning program.

Second, an overwhelming amount of data suggests that free weights (dumbbell and barbells) are used more than machines. For all three competitive levels, strength and conditioning coaches reported with no less than 95.5% that they used dumbbells and barbells. Of the machine types, pulley machines were used more than plate loaded; cam-type machines were used barely at all. For example, DI showed that 77.2% used pulley whereas only 67.4 % at the DI level used plate loaded machines. This suggests that the most basic of weight training implements are still the most popular and that pulley machines, being easier to use (less set up time) may hold a slight advantage over machines where you have to manually increase the weight with plates. Other commonly used equipment items were medicine balls, with all three competitive levels showing over 90%, and agility ladders with NBA and DII being slightly over 80% and DI being at nearly everyone (97.8%). Such pieces of equipment appear to be essential items for a professional or collegiate strength and conditioning coach to own as each would be an

asset in the strength and conditioning coach achieving their primary purpose for strength and conditioning, whether that is enhancing athletic performance or preventing injury.

Third and finally, the pieces of equipment that were not widely used were the Vertimax[®] and chains. The Vertimax[®] is a piece of equipment designed to increase vertical jump would seem to be an appropriate piece of equipment for basketball, a sport where jumping is a major component. However, the Vertimax is expensive (greater than \$1,000) dollars, limited in what it can accomplish (jump training), and lacks scientific research that it is more effective than Olympic weightlifting or plyometrics. The purpose of chains, for instance with the bench press, would be to increase speed and learn how to explosively thrust the barbell off your chest. This is more easily done since, as a result of the chains hanging from each end of the barbell, the weight is less at the bottom (the most difficult point of the lift) than at the lockout (top of the range of motion). However, chains are not inexpensive, you require a pair for each barbell, and chains are almost entirely limited to bench press and squats. Based upon the data then, it may be that the Vertimax[®] and chains are too expensive and/or too limited in what they can offer the strength and conditioning coaches to warrant their purchase.

Summary

In summary, seven points seem most important from the current study. First, NBA strength coaches perceived themselves as having higher levels of situational considerate and democratic behaviors than Division I strength and conditioning coaches. It was suggested that NBA strength and conditioning coaches may create strength and conditioning workouts that are more specific to the needs of NBA players and give the

players more input in this process, possibly because they want to avoid injuring an NBA player worth millions of dollars. Second, no significant differences were found between NBA and DI strength coaches when considering a training and instruction leadership style, suggesting common teaching styles at both levels. Third, no significant differences with the positive feedback subscale were found amongst any of the competitive levels, as all strength and conditioning coaches reported using positive feedback between “often” and “always”. Fourth, there was also no significant difference between DI and DII strength coaches with regards to social support, however, NBA strength coaches showed higher prevalence than DI and DII strength coaches. However, it is important to note that even though some leadership styles showed differences between competitive levels, they were still “highly used”. For example, situational considerations, social support, positive feedback, and training and instruction all showed statistical differences between the competitive levels but when comparing the means, all were still used “often” to “always” by the strength and conditioning coaches.

Fifth, for salary, NBA strength and conditioning coaches reported a greater frequency of high salary (greater than \$80,000) than DI or DII strength coaches. Sixth, Division II strength and conditioning coaches were also more likely to have additional job roles, with over 50% also being an assistant or head basketball coach. Seventh, concerning the sources of information, the primary source was “Other Strength and Conditioning Coaches” across all three competitive levels.

Eighth, when looking at training purposes and methods, the NBA was shown to make injury prevention the priority of their strength and conditioning routine with the

greatest frequency. Division I and II, however, marked enhancing/improving athletic performance as their first priority more frequently.

Ninth, a majority of NBA, DI, and DII strength and conditioning coaches perform plyometrics (nearly 100%) and athletic testing (nearly 100%). The NBA strength coaches were shown to highly favor anthropometrical, flexibility, and body composition testing. Tenth, when considering strength and conditioning equipment, a definitive consensus was found across all three competitive levels with the usage of dumbbells, barbells, medicine balls, and agility ladders. Items that appeared more specific to the NBA were balance disks/Airex pads, Theratubing[®]/Therabands[®], and foam rollers.

Finally, the present study served to expand as well as compliment and reinforce the accuracy of the prior NBA data collected by Simenz et al (2005). The most notable difference between the two studies was that the current study found a majority (61.8%) of NBA strength and conditioning coaches perform anaerobic capacity testing and a minority (31.8%) does cardiovascular testing. Previously, it had been shown that more test cardiovascular endurance (60%) than anaerobic capacity (50%) and that both were at least 50% of the total pool of participants (Simenz et al., 2005).

Limitations

There were three main limitations to this study. The largest limitation of the study was the number of participants. Even though over two-thirds of the NBA participated, this was still only 22 participants. The same could be said for Division I strength coaches, where close to a third of Division I men's basketball strength and conditioning coaches participated, but this was only 92 participants. A second limitation

was that the RLSS questionnaire was the coach-self evaluation version. The study was confined to strictly strength and conditioning coaches and therefore no comparison can be made between strength and conditioning coach perceptions and athlete perceptions of leadership styles. The third limitation was that only frequency data was obtained on the demographic information, strength and conditioning coach sources of information, training methods, plyometrics, and training equipment. Thus, statistical analyses between the three groups could not be done.

Future Research

For future research, four main areas should be considered. First, distribute the RLSS questionnaire and receive completed questionnaires from a larger sample of NBA, Division I, and Division II strength and conditioning coaches. Second, future research should examine strength and conditioning coaches' self-perception and athletes' perceptions of strength and conditioning coaches' leadership styles. This would allow for a comparison to be made across various competitive levels to see how strength coaches perceive themselves and how the athletes perceive their strength coach's leadership styles.

Third, an interesting advancement in the field would be to interview strength and conditioning coaches at various competitive levels and have them explain in-depth the reasons behind their training methods, selected sources of information, and equipment selection. Currently, most of the data is limited to frequency lists of what the strength coaches do or do not have. The suggested next course of research would help eliminate researcher guesswork and provide the reasoning behind the strength and conditioning coach, strength and conditioning practices.

Fourth, because only frequency data was obtained for demographic information, sources of information, training methods, plyometrics, and training equipment, it would be interesting to collect data and be able to run statistical analyses to determine statistical differences between various competitive levels.

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Vita

Mar Magnusen was born and raised in Lakeland, Florida. He graduated high school from Santa Fe Catholic High School and proceeded to attend college at Wheaton College (IL). In December of 2003, Mar completed a dual major in Kinesiology and English Literature and graduated with a Bachelor of Science degree. Upon completion of his Bachelors degree, Mar attended Texas Christian University (TCU) for his Master of Science in Kinesiology with an emphasis in Sport & Exercise Psychology. He graduated from TCU in May 2006.

Mar's professional experiences include:

- TCU Graduate Assistant Strength & Conditioning Coach
- Certified Collegiate Strength & Conditioning Coach
- Certified Specialist in Strength & Conditioning
- Certified Sport Performance Coach
- Certified Olympic Weightlifting Coach
- Certified Personal Trainer
- Member of the Association for Applied Sport Psychology (AASP)
- TCU Departmental Research Assistant
- CHAMPS / Life Player Development Internship
- Strength & Conditioning Internship with Chicago Bulls
- Strength & Conditioning Internship with Chicago Fire
- Strength & Conditioning Internship with F.C. Dallas

ABSTRACT

Assessing Differences in Strength and Conditioning Coach Self-Perceptions of Leadership Style at the NBA, Division I, and Division II Level

By Mar Magnusen, M.S. 2006
Department of Kinesiology
Texas Christian University

Thesis Advisor: Matt Johnson, PhD.

There is significant lack of sport psychology research that relates to strength and conditioning coaches. Therefore the purpose of this study was to examine the differences in self-perceived leadership styles of NBA, Division I men's basketball, and Division II men's basketball strength and conditioning coaches. The self-perceived leadership styles of 145 men's basketball strength and conditioning coaches (NBA = 22, DI = 92, and DII = 31) were obtained using the Revised Leadership Scale for Sport (Zhang, Jensen, & Mann, 1996; Jambor & Zhang, 1997). Some questions of the RLSS were adjusted slightly to reflect a weight room setting instead of an athletic setting. All subscales demonstrated a high reliability except for autocratic. Cronbach's Alpha for leadership was: .819 for democratic, .520 for autocratic, .813 for positive feedback, .831 for training and instruction, .724 for social support, and .741 for situational considerations. ANOVA results identified significance on five of the six subscales. Only positive feedback did not show significance. Scheffe post hoc tests were conducted on the five significant leadership subscales. Key findings showed that differences do exist between competitive level and strength and conditioning coach self-perceived leadership styles. The findings of the study indicate the importance of examining differences between competitive level and strength coach leadership styles as well as future studies to examine how strength coaches perceive themselves in comparison to how athletes perceive their strength coach's leadership styles.

Appendix A

RLSS Coach Self-Evaluation Questionnaire

Please indicate your preference by CIRCLING a number 1 – 5.
 ALWAYS (100%) OFTEN (75%) OCCASSIONALLY (50%) SELDOM (25%) NEVER (0%)

As a <u>STRENGTH COACH</u> I:	Always	Oftn	Occ	Seld	Never
1. Let the athletes share in decision making & policy formation	1	2	3	4	5
2. Congratulate an athlete after a good workout	1	2	3	4	5
3. Use other methods when efforts of the athletes are not working	1	2	3	4	5
4. Stay interested in the personal well-being of the athletes	1	2	3	4	5
5. Use a variety of drills/methods for the weight training session	1	2	3	4	5
6. Present ideas forcefully	1	2	3	4	5
7. Put the suggestions made by the team members into operation	1	2	3	4	5
8. Give credit when it is due	1	2	3	4	5
9. Adapt coaching style to suit the situation	1	2	3	4	5
10. Encourage close & informal relationships with the athletes	1	2	3	4	5
11. Supervise athletes' weight training exercises closely	1	2	3	4	5
12. Disregard athletes' fears & dissatisfactions	1	2	3	4	5
13. Let the athletes decide on weight training exercises	1	2	3	4	5
14. Express appreciation when an athlete lifts well	1	2	3	4	5
15. Coach to the level of the athletes	1	2	3	4	5
16. Help the athletes with their personal problems	1	2	3	4	5
17. Pay special attention to correcting athletes' lifting mistakes	1	2	3	4	5
18. Keep distant from the athletes (while not in training sessions)	1	2	3	4	5
19. Give the athletes freedom to determine training sessions details	1	2	3	4	5
20. Tell an athlete when they (the athlete) do a particularly good job	1	2	3	4	5
21. Assign different exercises for athletes based on situational needs	1	2	3	4	5
22. Remain sensitive to the needs of the athletes	1	2	3	4	5
23. Stress the mastery of greater weight training skills	1	2	3	4	5
24. Dislike suggestions & opinions from the athletes	1	2	3	4	5
25. Get approval from the athletes on important <u>training matters</u> before going ahead with the training	1	2	3	4	5
26. Compliment athlete(s) for good training in front of others	1	2	3	4	5
27. Assign training exercises according to athlete ability & need	1	2	3	4	5
28. Perform personal favors for the athletes	1	2	3	4	5
29. Make complex exercises easier for athletes to understand & learn	1	2	3	4	5
30. Prescribe/dictate the exercise methods that the athletes need to follow	1	2	3	4	5

Please indicate your preference by **CIRCLING** a number 1 – 5.
 ALWAYS (100%) OFTEN (75%) OCCASSIONALLY (50%) SELDOM (25%) NEVER (0%)

As a <u>STRENGTH COACH</u> I:	Always	Oftn	Occ	Seld	Never
31. Ask for the opinions of the athletes on strength coaching matters	1	2	3	4	5
32. Recognize individual contributions to the success of each training session	1	2	3	4	5
33. Increase complexity & demands if the athletes find demands are too easy	1	2	3	4	5
34. Look out for the personal welfare of the athletes	1	2	3	4	5
35. Clarify weight training priorities & work on them with the athletes	1	2	3	4	5
36. Refuse to compromise on weight training point / matter	1	2	3	4	5
37. Let the athletes try their training methods even if they make a mistake	1	2	3	4	5
38. Reward an athlete as long as the athlete tries hard (their best)	1	2	3	4	5
39. Modify training to be appropriate to the time of the season	1	2	3	4	5
40. Visit with the friends / family of the athlete(s)	1	2	3	4	5
41. Possess a good knowledge of strength & conditioning	1	2	3	4	5
42. Plan for the team relatively independent of athlete input	1	2	3	4	5
43. Ask for the opinions of the athletes regarding specific training strategies	1	2	3	4	5
44. Praise athletes' good effort even if they miss a lift	1	2	3	4	5
45. Alter weight training plans to unforeseen events	1	2	3	4	5
46. Encourage the athletes to confide in the strength coach	1	2	3	4	5
47. Explain to each athlete the techniques & tactics of weight training	1	2	3	4	5
48. Fail to explain strength & conditioning coach actions in the weight room	1	2	3	4	5
49. Encourage the athletes to make weight training suggestions	1	2	3	4	5
50. Encourage the athletes a weight training mistake is made	1	2	3	4	5
51. Clarify weight training goals & the path to reach those goals to athletes	1	2	3	4	5
52. Use objective measurements for evaluation (i.e. vertical jump test)	1	2	3	4	5
53. See the merits of athletes' ideas when they differ from strength coaches	1	2	3	4	5
54. Pat an athlete after a good weight training performance	1	2	3	4	5
55. Set weight training goals that are compatibility with the athlete's ability	1	2	3	4	5
56. Conduct proper progressions in teaching weight training fundamentals	1	2	3	4	5
57. Get input from the athletes about weight training at team meetings	1	2	3	4	5
58. Clap hands when an athlete does well during a weight training session	1	2	3	4	5
59. Let the athletes set their own weight training goals	1	2	3	4	5
60. Show positive gestures to the athlete for a good weight training session	1	2	3	4	5

Appendix B
Human Subjects Protocol



INSTITUTIONAL REVIEW BOARD

PROTOCOL REVIEW REQUEST

The TCU Institutional Review Board is responsible for protecting the welfare and rights of individuals who are subjects of any research conducted by faculty, staff, or students of Texas Christian University. Approval by the IRB must be obtained prior to the initiation of a project, whether conducted on-campus or off-campus.

Please submit this form electronically to the IRB Chair, Dr. Tim Hubbard, and Jan Fox; include any research-related materials such as informed consent forms, questionnaires, or other documents to be utilized in data collection or may be needed by each board member to review the research protocol. **IRB committee meetings will be held the first Tuesday of each month.** In addition to the electronic copies, 10 copies of the protocol should be brought to Jan Fox in the Office of Research and Sponsored Projects, Sadler Hall, Room 208 or TCU 297023. The protocol should be delivered at least 10 days before the date of the committee meeting to be considered. Only one copy is required of data collection which includes videos or other types of media.

Date: Spring 2005

1. **Project Title:** Assessing Differences in Strength and Conditioning Coach Self-Perceptions of Leadership Style at the NBA, Division I, and Division II Level
2. **List the name and Faculty/Students/Staff status of the person(s) conducting the research.**
 - a. **Principal Investigator:** Mar Magnusen
 - b. **Department:** Kinesiology
 - c. **Others:** Dr. Matt Johnson
3. **Project Period:** Summer 2005

4. Funding

a. **Agency:** Texas Christian University

5. In a paragraph or two, summarize the objective(s) of the research, including what you expect to learn or demonstrate:

The objective of this research is to determine whether or not there is a difference between competitive levels of men's basketball and strength and conditioning coach self-perceptions of leadership style. As well, frequency data about demographic information, sources of information used by strength coaches and various training methods employed for each of the three divisions will be explored. Because of the current void in the literature relating to strength and conditioning coupled with sport psychology, the present study will help to fill the void and begin to apply sport psychology principles and tools of measurement to the strength and conditioning realm.

6. Describe subject population and plans for the recruitment of subjects and the consent procedures to be followed. Is participation completely voluntary? May subject withdraw at any time without a penalty? Will any kind of incentive be offered to participants? Where students are used as subjects, indicate alternatives available in lieu of participation. Include a copy of Informed Consent Form, which must include, at a minimum: statement of purpose of research, duration of participation for the subject, procedures, description of any experimental procedures, description of possible risks/discomforts and benefits, alternative procedures, measures to protect confidentiality, compensation, statement regarding voluntary participation, ability to withdraw without penalty, procedure for withdrawal, who to contact at the university should there be questions about the research, including investigator, director of ORSP, Committee Chair. This information should include name, title, address, and phone number of each contact. There should be space at the bottom of the form for the date and both the printed name and signature of the participant and the person obtaining the informed consent.

The participants of this study will consist of strength and conditioning coaches from the NBA, DI, and DII competitive level. The anticipated number of strength coaches from each competitive level is 30 (NBA), 100 (DI), and 100 (DII). Strength coaches at each competitive level have contact information on the internet that will be used to introduce the study and inquire as to whether or not the strength coach is interested in participating. Further, at the NBA level, a letter of introduction from a current NBA strength coach will be included with the questionnaire to improve the likelihood of return. All envelopes will include an informed consent, questionnaire packet, and a self-addressed stamped envelope.

- 7. Provide a brief summary of the procedures to be utilized during the course of the project. Specifically identify those procedures, tests, or activities, which will be used.**

Individuals will be mailed a packet with a return envelope that is addressed and stamped. The participants will be asked to complete all questions. The RLSS self-perception version is comprised of 60 questions. Included with this is a demographic and experimental questionnaire. The questionnaire packet should take between 15-20 minutes to complete. All questionnaires and related information will be kept in the sport psychology laboratory. At no time will individual information be released to anyone. At no time will the respondents be exposed to any psychological or physical harm.

- 8. Describe how the procedures reflect respect for the privacy, feelings, and dignity of subjects, avoid an unwarranted invasion of privacy, and minimize risks as much as possible. If protected health information (PHI) is to be collected, describe the procedures of de-identification, the minimum information necessary to be disclosed, and who will have access to the information. In addition, describe conditions for a designated individual's access to the PHI.**

The questionnaire being distributed is the Revised Leadership for Sport Scale (RLSS). Included with this questionnaire is a demographic questionnaire and several experimental questionnaires that will be used to collect frequency data. Further, the questionnaires in this study will respect the participant's privacy, feelings, and dignity. All information is confidential and will be kept anonymous by the researcher.

- 9. Describe and assess any potential attendant risks.* Indicate any physical, psychological, social, or privacy risks which subject may incur. (This includes any request for the subject to reveal any PHI and/or embarrassing, sensitive, or confidential information about themselves or others). If any deception is to be used, describe it in detail. Include plans for debriefing.**

With this research study there is no potential physical, psychological, social, or privacy risks that the participants might incur. The participants are not physically at risk by answering the questionnaires. If the individuals would like to receive information on the research study we will happily send them the final results of the overall study.

- 10. Describe the procedures to assure confidentiality in the use, storage, and disposal of the primary data. (Upon completion of the research, copies of subjects' signed consent and PHI authorization forms are to be delivered to the Office of Research and Sponsored Projects, Sadler Hall 208, for permanent storage). If PHI is to be re-identified at a later date, describe the procedures in doing so.**

All information concerning the research study will be kept in a cabinet in the sport psychology laboratory. The lab is only accessible via key card and only graduate students and professors have access to this facility. No persons will be able to access this information unless they are directly associated with the research taking place and not without the approval and direct supervision of Dr. Johnson.

- 11. Describe how the outcomes of this project will contribute to a professional body of knowledge and/or benefit human welfare.**

The impact of the current research project will be that is hopefully provides: (1) data on statistical differences on the self-perceived leadership styles of NBA, Division I, and Division II strength and conditioning coaches, (2) demographic information on the three strength and conditioning coach competitive levels, and (3) frequency data on the three levels of strength and conditioning coaches' sources of information and training methods. This research data will help the strength and conditioning and sport psychology fields by examining various competitive levels, leadership styles, and training methods as they pertain to training athletes in a strength and conditioning setting, rather than an athletic competition setting; thus, the data from the examination will begin to fill the aforementioned voids in the strength and conditioning and sport psychology literature.

- 12. Provide proof that you have completed computer-based training on the Protection of Human Subjects at:**

* <http://cme.cancer.gov/clinicaltrials/learning/humanparticipant-protections.asp>

Name Mar Magnusen
Printed

Signature Mar Magnusen

Date: 11/7/2004

TCU Box _____ Ext. _____ Email address: _____

Appendix C
Consent Form

Texas Christian University

Department of Kinesiology

As a strength and conditioning assistant coach and a master's student in Kinesiology, I am greatly interested in furthering the growth of both strength and conditioning and the exercise sciences. As a result of this interest, I'm aware that coaching is a learned skill that takes great time and effort to master, especially when considering the differences between the collegiate and professional ranks. Thus, I'm interested in the differences with demographics and leadership styles / coaching behaviors between NBA, Division I, and Division II strength and conditioning coaches.

For this study you will be asked to complete two questionnaires regarding: 1) your background and training methods & 2) your leadership style(s). The questionnaire packet is a simple, noninvasive, paper and pencil inventory that should take no more than 10 minutes to complete. In no way will your answers put you at any risk.

You are free to withdraw at anytime without penalty or consequence. Participation in this study is completely voluntary. Apart from the informed consent form, no names are required on the questionnaire. The only distinguishing characteristic will be the delineation between NBA, DI, and DII strength coaches. Only the lead researcher will have access to your responses, which will be used to characterize the findings of the study. Note that upon the completion of the study, all data will be destroyed.

The information gathered from this study will be potentially beneficial and therein enhance the experience of other athletes of their caliber with their strength and conditioning experience.

If by chance you have any questions or concerns, do not hesitate to contact TCU and ask for either Dr. Matt Johnson at 817-257-6866 or Dr. Deborah Rhea at 817-257-6861. They are the faculty advisors for the project.

I understand the above information & agree to participate in the study described above.

Printed Name _____

Signature _____

Date _____

Appendix D

Demographic Questionnaire

AGE: _____ **GENDER:** MALE FEMALE

ETHNICITY: Caucasian African-American Hispanic Asian Other _____

HIGHEST COMPLETED EDUCATION LEVEL: Bachelor's Master's Doctorate

WAS YOUR MAJOR IN A HUMAN PERFORMANCE RELATED FIELD (ex. exercise science/ kinesiology/ physical education/ health & human sciences)?

YES NO

WHAT IS YOUR STRENGTH COACH TITLE: _____

DO YOU SERVE IN ROLE BESIDES A STRENGTH COACH? IF YES, CIRCLE ONE:

ASSISTANT COACH HEAD COACH ATH. TRAINER OTHER _____

CERTIFICATIONS: NSCA-CSCS CSCCa-SCCC ISSA-SSC

USAW OTHER _____

HAVE YOU SERVED AS A VOLUNTEER STRENGTH COACH AT ANY LEVEL?

YES NO

HAVE YOU SERVED AS A GRAD. ASSIST. STRENGTH COACH AT ANY LEVEL?

YES NO

TOTAL YEARS A FULL-TIME STRENGTH COACH (not volunteer or G.A.)? _____

NUMBER OF YEARS IN CURRENT STRENGTH COACH POSITION: _____

TOTAL JOB MOVES AS A FULL-TIME STRENGTH COACH: _____

AVERAGE NUMBER OF HOURS YOU WORK PER WEEK:

IN-SEASON _____ OFF-SEASON _____

AVERAGE SALARY (circle one):

<20,000	20,000-29,999	30,000-39,999	40,000-49,999
50,000-59,999	60,000-69,999	70,000-79,999	>80,000

Appendix E

Exploratory Research Questionnaire

GIVE RANK TO YOUR TOP 3 SOURCES OF INFORMATION OUTSIDE OF EDUCATION (1 = Top Source; 2 = 2nd Most Important; 3 = 3rd Most Important):

- Coaches/Other Programs Books Journals Certification
 Clinics Conventions Videos Internet
 Professionals Personal Experience Magazines Studies
 Research Science

WHICH ARE THE MOST IMPORTANT GOALS/BENEFITS OF A STRENGTH PROGRAM AT YOUR CURRENT LEVEL (PRO, D1, D2)? (RANK 1 = Most Important; 2 = 2nd Important; 3 = 3rd Important)

- Injury prevention/Injury reduction Intangibles (i.e. enhance confidence)
 Increase strength/power/mass Enhance/improve athletic performance
 Other (explain) _____

WHAT SPECIFIC TRAINING METHODS DO YOU USE (mark all that apply)?

- Multiple sets Plyometrics Olympic lifts Explosive mvments
 Training to failure Loading/mimicking skilled movements Single sets
 Slow lifting speeds Balance/proprioceptive training Other _____

WHAT SPECIFIC TRAINING EQUIPMENT DO YOU USE (mark all that apply)?

- Dumbbells Barbells Olympic platforms
 Plate-loaded machine Pulley machines Theraband/Theratubing
 Manual resistance Balance disks/Airex pads Foam rollers
 Medicine balls Cones/mini-hurdles Agility ladder
 Cam-type machines Chains, tires Speed equipment
 Sandbags, Swiss balls VertiMax ©

DO YOU PERFORM FITNESS TESTING WITH YOUR ATHLETES? YES NO

WHAT TYPES OF FITNESS TESTING DO YOU PERFORM WITH YOUR ATHLETES?

Mark all that apply.

- | | | |
|--|--|---|
| <input type="checkbox"/> Acceleration | <input type="checkbox"/> Agility | <input type="checkbox"/> Anaerobic capacity |
| <input type="checkbox"/> Anthropometrical | <input type="checkbox"/> Body composition | <input type="checkbox"/> Cardio. Endurance |
| <input type="checkbox"/> Flexibility | <input type="checkbox"/> Muscular enduran. | <input type="checkbox"/> Muscular power |
| <input type="checkbox"/> Muscular strength | <input type="checkbox"/> Speed | Other _____ |

DO YOU PERFORM PLYOMETRICS WITH YOUR ATHLETES? YES NO

**WHAT IS YOUR MAIN PURPOSE FOR USING PLYOMETRICS WITH YOUR ATHLETES?
(RANK 1 = Most Important; 2 = 2nd Important; 3 = 3rd Important)**

- | | | |
|--|---|---|
| <input type="checkbox"/> Total body training | <input type="checkbox"/> Lower body power | <input type="checkbox"/> Upper body power |
| <input type="checkbox"/> Speed development | Other _____ | |

AT WHAT POINT IN THE SEASON ARE PLYOMETRICS A PART OF YOUR ATHLETE'S WORKOUT?

Mark all that apply.

- | | | |
|--|-------------------------------------|--------------------------------------|
| <input type="checkbox"/> Pre-season | <input type="checkbox"/> In-season | <input type="checkbox"/> Post-season |
| <input type="checkbox"/> Training camp | <input type="checkbox"/> Year round | |

WHEN ARE PLYOMETRICS INTEGRATED INTO YOUR ATHLETE'S WORKOUT?

Mark all that apply.

- | | | |
|---|--|---|
| <input type="checkbox"/> Separate days | <input type="checkbox"/> Before weights (same day) | <input type="checkbox"/> Complex training |
| <input type="checkbox"/> After weights (same day) | Other _____ | |

WHAT TYPES OF PLYOMETRIC EXERCISES ARE TYPICALLY USED?

Mark all that apply.

- | | | |
|---|--|---|
| <input type="checkbox"/> Bounding | <input type="checkbox"/> Box drills | <input type="checkbox"/> Depth jumps |
| <input type="checkbox"/> Jumps in place | <input type="checkbox"/> Multiple hops | <input type="checkbox"/> Standing jumps |
| <input type="checkbox"/> Upper body plyometrics | | |

DO YOU PERIODIZE YOUR ATHLETES' ROUTINES? YES NO

WHAT IS THE AVERAGE NUMBER OF WEIGHT TRAINING SESSIONS PER WEEK FOR YOUR ATHLETES DURING...

IN-SEASON? _____

OFF-SEASON? _____

AVERAGE DURATION (time) OF IN-SEASON
WEIGHT TRAINING SESSION? _____

AVE. DURATION OF OFF-SEASON
WEIGHT TRAINING SESSION? _____

WHAT PERCENTAGE OF ATHLETIC SUCCESS DO YOU ATTRIBUTE TO A STRENGTH TRAINING PROGRAM (circle only 1)?

<25%

25-50%

50-75%

>75%

Appendix F

Scoring of the RLSS Questionnaire

Distribution of RLSS Categories

***DEMOCRATIC—12 ITEMS:** 1, 7, 13, 19, 25, 31, 37, 43, 49, 53, 57 & 59

***POSITIVE FEEDBACK—12 ITEMS:** 2, 8, 14, 20, 26, 32, 38, 44, 50, 54, 58 & 60

***SITUATIONAL—10 ITEMS:** 3, 9, 15, 21, 27, 33, 39, 45, 51 & 55

***SOCIAL SUPPORT—8 ITEMS:** 4, 10, 16, 22, 28, 34, 40 & 46

***TRAINING (TEACHING) & INSTRUCTION BEHAVIOR—10 ITEMS:**
5, 11, 17, 23, 29, 35, 41, 47, 52 & 56

***AUTOCRATIC—8 ITEMS:** 6, 12, 18, 24, 30, 36, 42 & 48