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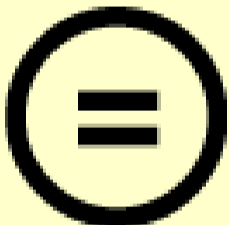
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**ATHLETES' PERCEPTIONS OF
THE MOTIVATIONAL CLIMATE
AND THE COACH-ATHLETE
RELATIONSHIP**

by

Alkistis Olympiou

Loughborough University

A Doctoral Thesis

Submitted in accordance with the Award of Doctor of Philosophy

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ABSTRACT

This thesis attempted to develop a clearer understanding of the social environment surrounding the athlete and the coach in the team sport context. To that end, achievement goal theory served as the main framework of the social environment's interpretation and was studied in relation to the newly developed coach-athlete relationship conceptualisation. The representative frameworks and conceptualisations introducing these two concepts were discussed in Chapter II, along with a review of the relevant literature in the domain of sport. Specifically, the association between athletes' perceptions of the motivational climate created by the coach and athletes' perceptions of the coach-athlete relationship in terms of Closeness, Commitment, and Complementarity, was examined in Study 1, which comprised Chapter III. Results from canonical correlational analysis showed that athletes' perceptions of a task-involving motivational climate were positively associated with high scores on the Closeness, Commitment, and Complementarity elements. Athletes' perceptions of an ego-involving climate were negatively associated with the Closeness, Commitment, and Complementarity elements. These associations were studied at one point in time, with a cross-sectional design. The second study, which comprised Chapter IV, extended Study 1, in investigating these associations across a nine-month academic period. Results from the Latent Growth modelling analysis showed that specific aspects of the task- and ego-involving climate and specific elements of the coach-athlete relationship changed linearly across time, whereas other remained stable. Moreover, it was shown that athletes' perceptions of the coach-athlete relationship predicted later change in athletes' perception of ego-involving climate, supporting the association between these constructs across time. The consistent association between perceptions of the motivational climate and the coach-athlete relationship provided the basis for examining their effects on potential cognitive, affective and behavioural outcomes through comparative models, in Study 3, which comprised Chapter V. The third study's unique contribution lies in the examination of the mechanisms through which such effects took place. Results from Structural Equation modelling analysis showed that both, perceptions of the motivational climate and the coach-athlete relationship predicted, through the satisfaction of the basic needs, substantial variation in athletes' motivation, role ambiguity, satisfaction, and performance. Collective results of all the studies, limitations, future directions and implications are discussed in Chapter VI. The intention of this thesis has been to extend past work on the

study of the athletic social environment. An amalgamation and incorporation of motivational theories and a relationship conceptualisation was assumed to aid in a better and more holistic understanding of the athletes' experience of the social sporting context.

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CHAPTER 1

INTRODUCTION

1 Introduction

Sport psychology researchers have placed great emphasis on the investigation of various factors affecting the performance and well-being of athletes, but these factors have been examined in isolation with very few studies looking at the social environment in the context of sport (Iso-Ahola, 1995). The focal point of the sport psychology literature has been around intra-individual differences. Only recently have the inter-individual processes gained credibility and attracted sport psychologists' attention. Among these interpersonal processes, perceptions of the relationships formed in the athletic context and the prevailing environment have captured researchers' attention during the last decade, but the study of these relationships is still limited. Wylleman (2000) highlighted this deficiency in the literature by stating that "interpersonal relationships lack scientific delineation" (p. 558). Coach and athlete interactions have repeatedly been seen as impacting athletic performance.

The central theme of the present thesis concerns the investigation of the social athletic environment surrounding the coach and the athlete, and it is approached from two perspectives. The first perspective concerns the interpersonal relationships that are formed between the athlete and the coach. The second perspective concerns the motivational environment in the team as it is created by the coach. Anecdotal evidence suggests that the environment and the relationship that coaches create and develop within their teams have a great impact on the athletes' performance and sport development. An example from the team world of rugby is Clive Woodward, England's first appointed full-time coach in 1997. By developing good coach-athlete relationships and being fiercely loyal to those players who believed in him, Woodward led the English national team to a series of successful seasons and finally to the World Cup in 2003. The athletic relationship between Roy Keane and Alex Ferguson at Manchester United, between Harry and Jamie Redknapp at Southampton, and between Jose Mourinho and John Terry at Chelsea are examples of good, effective football coach-athlete partnerships that proved successful. Especially the first relationship has lasted over ten years, with both relationship parties being equally committed to shared goals. As Keane (2002) describes in his autobiography, Ferguson offered him social support, was considerate, and listened to, trusted and accepted him, thus raising feelings of trust, respect, and commitment from his athlete. However, relationships between coaches and athletes have not always been fruitful and helpful.

Not all teams and athletes blossom under the guidance of their coach. Exploitative and abusive coach-athlete relationships can have a great emotional cost for the well-being of athletes; contribute to their withdrawal, not to mention the impact on the coach's career or termination of it.

Social environments in sport have also been approached during the last 20 years from a motivational angle, placing emphasis on how athletes perceive the criteria and the values promoted by the architects of these environments (Pensgaard & Roberts, 2000). Coaches, as the main contributors to structuring the climate in a team, set the criteria by which competence will be construed and success and failure will be evaluated (Ames, 1992a; 1992b; Nicholls, 1989). Achievement goal theory (Nicholls, 1989) has been particularly relevant in describing and explaining these climates created within sport and within education domains that are characterised by achievement, where success and failure are salient and where perceptions of ability are most pertinent. In these achievement settings, students and athletes are continuously judged and assessed by their performance outcomes. Their motivation, well-being, and behavioural and psychosocial development are highly related to what goals are promoted and how the coach construes the environment (Duda, 2001). Ferguson for example singled out Keane, thus setting an example of favouritism and a criterion of success based on competence, in contrast to Murinho who creates a climate of acceptance and highlights the important role of all players regardless of ability level. In many coach-athlete relationships, coaches might "unwittingly get caught in the unclear delineation between the power and authority inherent in the coach/athlete relationship" (The global coach, 1999, <http://www.icce.ws/bulletin/power.htm>). Misuse of the coach's power in his or her decisions and actions affects all the people engaged in that environment: athletes, other coaches, parents or even friends.

Acknowledging the importance of the coach for the sporting and psychosocial development of the athletes, having a keen interest in coach-athlete interpersonal relationships, and having worked personally as a coach for ten years while earlier serving another 10 years as a top-level table tennis player, the time seemed ripe for me to closely study the motivational and social context embracing the coach and the athlete. Given my knowledge of the importance of the motivational climate, the coach-athlete relationship, and the impact of the coach on various outcomes, and judging from my own experiences with various top-level coaches, I can confidently

identify their role in my own performance, further psychosocial development and world view. Thus, I decided to embark on this endeavour to explore and explain the social environment of team sports, aspiring to the enrichment of knowledge in this area.

CHAPTER 2

LITERATURE REVIEW

2 Literature Review

Motivation has been at the forefront of sport psychology literature for over thirty years and continues to capture researchers' attention from different perspectives. Of the different strands that researchers have pursued to investigate the concept of motivation, most pertinent to the sport domain has been achievement goal theory (Nicholls, 1989). The ability with which it thoroughly explains achievements has made it one of the most appropriate perspective lenses through which motivation can be explored (Duda, 1992; 1993; 2001). Conceptually and methodologically my research follows this line of research.

The research reported in this thesis approaches the nature of achievement motivation from a *contextual* perspective and focuses on the athletes' perceptions of the sporting environment in which they operate. More specifically, the present study pulls together two important areas of sport psychology literature: achievement goals and the conceptualisation of coach-athlete dynamics from a relationship perspective. The association between these two approaches is explored along with (a) two other correlated variables, antecedents and consequences, (b) the mechanisms and processes with which these variables impact on motivation and (c) their trajectory over time.

In the first section of this chapter, the theory and tenets of achievement goal theory as propounded by Nicholls (1989) will be presented. The second section will review the literature that has studied athletes' perceptions of the motivational climate in terms of various antecedents and consequences. In the third section the integrated model of leadership and motivation developed by Duda and Balaguer (1999) will be described. The fourth section will be allocated in the conceptualisation of the coach-athlete relationship via the 3+1 Cs (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004; Jowett, Paull, & Pensgaard, 2005). A synopsis and the research objectives will be illustrated in the final section of Chapter II.

2.1 Achievement Goal Theory

2.1.1 Theoretical Framework (Nicholls)

According to Nicholls (1984, 1989) ‘personal goals of action’ are the determinants of achievement behaviour. Personal goals of action refer to the reasons why people are striving to accomplish their goals rather than to the actual content of the goals. For example, striving to win the World Cup or the gold medal at the Olympics fall under one type of goals, namely performance goals, and they refer to the content of these goals, namely to *what* these goals are. Achievement goal theorists go further than the mere identification of the types of goals athletes pursue, by trying to understand *why* athletes pursue them. For example, their main focus would be on why they strive to win the World cup or the gold medal at the Olympics, and on how they approach and engage in these goals. The main focus of the theory is concerned with the quality rather than the quantity of motivation. For example, two athletes might exhibit the same motivation to execute a difficult shot, but for completely different reasons. However, achievement goals not only contain the reasons why individuals strive to achieve, but reflect a standard by which performance and success or failure in reaching those goals are judged (Nicholls, 1989).

In achievement contexts, such as sporting or educational settings, the basic focus is the demonstration of competence or ability. The fundamental principle and central tenet of achievement goal theory is grounded on perceptions of competence. Nicholls’ achievement goal theory is less concerned with how much competence an individual possesses, but focuses more on the meaning of competence for the individual. The meaning individuals assign to competence, the way they construe success and define successful goal accomplishment, influences their goal adoption and subsequent cognitive, affective and behavioural outcomes (Duda, 2001). It has been presumed that variations in motivated behaviour are a function of how athletes interpret their sport experiences. Therefore, achievement behaviour is a function of the personal meaning the individuals attribute to perceived success and failure (Maehr & Braskamp, 1986). The goals that individuals try to achieve create a framework within which these individuals interpret and react to events. Duda and Nicholls (1992) argue that this “post-modern view”, namely that people’s thoughts and actions are related to their goals, is consistent with the ecological approach to social perception (McArthur & Baron, 1983) and the intentional approach to thought and action (Dennett, 1977). The decision of which goals individuals will adopt in an achievement setting will determine the amount of effort they will

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exert on the completion of a task, their level of persistence in that task, as well as their subsequent cognitions, attitudes, and affective responses (Maehr & Braskamp, 1986).

Among the proposed achievement goals two are represented in the achievement goal theory and have been examined extensively. These have been variously termed learning and performance goals by Dweck and colleagues (Dweck, 1986; Dweck & Leggett, 1988; Elliot & Dweck, 1988), mastery and performance goals (Ames & Archer, 1987, 1988) task-oriented and ability-oriented goals (Maehr & Nicholls, 1980), and task- and ego-involving goals (Maehr, 1984; Nicholls, 1984). Although each achievement goal theorist adopts their preferred nomenclature, and given the fact that there exist subtle conceptual differences regarding the exact nature and functioning of goals and the construct of ability, nevertheless the perception and role of goal adoption are common to all of them (Duda, 2001). As the theoretical grounding point for my conceptualisation of achievement behaviour is based on Nicholls' theory, his terminology of task- and ego-involving goals will be used in the present thesis. Duda (1992, 1996) has repeatedly stated that whether applied to goal states, dispositions or environments, Nicholls' terms of task- and ego-involving goals should be used because the rest "seem more conducive to ambiguous usage and obscure definitions" (Duda & Whitehead, 1998, p. 22).

Learning goals, mastery-goals, and task-involving goals refer to a self-referenced perception of ability. These goals are concerned with developing ability. Task-involved individuals focus on learning, developing, and mastering new skills. They construe their competence in terms of self-improvement and achieving their self-set standards. Within this type of goal, individuals hold the belief that there is a correlation between effort and ability, in that more effort exerted results in more ability developing. This type of goal bears similarities with intrinsic motivation (Deci & Ryan, 1980, 2000). When task-involved, individuals experience the task, activity or sport as an end in itself rather than a means to an end, therefore they are intrinsically motivated (Nicholls, 1989); in simple words, they participate in sport 'for the love of the game'. In the task-involving state, individuals value learning and participate in the task for the pleasure of learning new skills and improving their competence. Their enjoyment and satisfaction is derived from the immersion in the intrinsic value of learning, mastering the activity and development of their skills. Task-involved individuals are expected to choose moderately challenging tasks and exert high levels of effort towards their accomplishment. The perceived levels of ability are not threatening at this stage, as the focus is not to prove higher ability but rather to enhance it.

Performance goals, ability-oriented goals, and ego-involving goals refer to a normative-referenced perception of ability and are concerned with the demonstration of high ability, or the avoidance of demonstrating low ability. Ego-involved individuals are trying to surpass others on normative standards. Their whole achievement experience is viewed as a means to an end. In an ego-involving state the activity is experienced as a means of demonstrating superior ability. Ego-involved individuals do not derive enjoyment and satisfaction from the mere learning process unless it results in success. Individuals are less intrinsically motivated, and external motivation is more pronounced. Perceived ability plays a decisive role at this state. In line with Deci and Ryan's (1980, 2000) self-determination theory, and more specifically with the tenets of cognitive evaluation theory, ego-involved individuals value the extrinsic rewards of the experience, be it glory, fame or money that originate from succeeding. A salient achievement situation that provides individuals with the opportunity to demonstrate competence in public, apart from the academic domain, is competitive sport. In this context, the cups, trophies, and other external rewards are salient, abundant, and tied up with the athletes' participation.

Nicholls (1992) argued that two conceptions of ability exist when an individual enters an achievement situation, the undifferentiated and the differentiated. He also proposed that these conceptions of ability that lead to states of involvement are distinct and independent and may fluctuate within an achievement situation but cannot be experienced at the same time. Furthermore, he discussed the developmental changes in children's conceptions of ability. Children at different developmental age-related stages possess different theories on what ability is, and how it is related to luck, skill, difficulty and effort (Nicholls, 1984, 1990). At a very young age, up to 5 years old, children possess an undifferentiated conception of ability, wherein they are unable to distinguish the concept of ability from those of effort, luck and task difficulty, and only at the age of 12 does this differentiation take place. The concepts of luck and skill are confounded in children's perceptions and begin to differentiate at about nine years of age, whereas the concept of difficulty develops at the age of eight (Nicholls, 1989; Nicholls & Miller, 1984). Children of that age start to understand that effort will not make any difference in tasks that are determined by chance.

Regarding the relationship between ability and effort in the undifferentiated stage, Nicholls describes the developmental process in the following stages. A child at the age of 5 confuses the concepts of ability, luck, skill and effort, and does not clearly distinguish between the elements of ability and effort as causes of achievement outcomes. A child that tries hard is thus

automatically considered smarter irrespective of the outcome. At the age of 6 or 7, children begin to develop a differentiated conception of effort and outcome. Equal effort should lead to equal outcomes, but in case of equal outcomes and different amount of effort exerted, they find it difficult to bring ability into the equation. At the age of 8 or 9, children begin to understand that ability is connected with effort exerted when equal outcomes are produced. Individuals in the 'undifferentiated conception of ability' stage call upon previous levels of performance to judge their ability. They feel successful when they learn, develop and master their current skills or new skills and ultimately also when they demonstrate mastery of the task at hand. This stage is more mastery- or task-oriented.

The total differentiation takes place at the age of 12 or 13. At the stage of differentiation, children conceive effort and ability as distinct causes of achievement outcomes. Nicholls (1989) referred to this as "*ability-as-current capacity*" because children who hold a differentiated conception of ability begin to understand that exerting effort will increase their performance up to the limit of their current capacity. Individuals in the differentiated stage define ability according to normative values and cues. Winning is the only criteria that they call upon to judge their success. They only feel successful when they perform better and generally demonstrate superiority over their teammates, peers and opponents. Therefore, exerting less or equal effort when they are winning and outperforming others is an indication of high ability. Conceptions of ability play decisive role in the differentiated stage where individuals are ego-involved. Low perceptions of ability adopted by an ego-involved individual are expected to result in failure in a normatively moderate task and therefore individuals will assess the failure as incompetence.

The conception of ability in two separate ways has distinct motivational consequences. Each of these two conceptions of ability will lead to the adoption of different goals in an achievement situation, or else the conceptions of ability that are salient at a particular point in time will activate different types of achievement goals. These goals will correspond to the undifferentiated and differentiated conceptions of ability and will constitute distinct criteria for assessing one's competence and success. These adopted goals will ultimately direct behavioural, affective, and cognitive responses. Accordingly, achievement behaviour that has adopted the undifferentiated conception of ability is termed task-involvement whereas achievement behaviour that has adopted a differentiated conception of ability is termed ego-involvement. Reaching the age of 12, children are capable and free to decide and choose which conception of ability they prefer to adopt. Children enter an achievement situation with their

own conceptions of ability but whether they will adopt the differentiated or undifferentiated conception of ability depends on situational cues (Nicholls, 1989).

At this point, a differentiation should be made between goal-involvement states, goal orientations, and goal-involving climates. The following introduction to the basic constructs of goal involvement and goal orientations is however very brief as the focus of the present study is not directly on these constructs, but centres rather around the contextual cues affecting achievement motivation. The rest of the chapter is allocated to the introduction of the motivational climate and the research conducted to assess its impact on achievement behaviour, cognitions, and emotions. However, before entering into the details of Nicholls' theory, a short comparison is presented between the tenets of his theory and other achievement goal theorists.

2.1.2 Similarities and Differences between Nicholls' Theory and other Achievement Goal Theories

Nicholls' theory, falling under the broader umbrella of achievement goal theory, shares a lot of common characteristics with other achievement goal theories, but differs from some of them in several issues. Firstly, similarities among the achievement goal theorists concern the central position ability beliefs are given within their frameworks (Weiss & Chaumeton, 1992). In a task, learning or mastery state, individuals adopt self-referenced criteria and use them to judge success and failure towards the mastery of the task at hand. Errors and mistakes that are made during performing a task are viewed as part of the learning process. Because the main aim in a task-involving state is not to demonstrate perceptions of ability and competence or intelligence, but rather to improve them, high or low perceptions of ability are not detrimental to an individual's achievement behaviour. Challenging tasks are more likely to be selected, because individuals are not concerned with the evaluation of their ability, do not fear that they might show low ability, and believe that effort and persistence will be salient.

In an ego or performance state, individuals adopt normative referenced criteria, and the main objective is the demonstration of high ability and the avoidance of the demonstration of low ability. Ability perceptions are very relevant to individuals' subsequent achievement behaviour. Low ability perception holders might engage in non-challenging tasks, to ensure the demonstration of high ability, or engage in extremely difficult tasks, in which success will demand high ability, and failure will be attributed to the difficult nature of the task. High ability holders are more likely to engage in challenging tasks demonstrating a similar behaviour pattern to the task-oriented individuals' one.

Secondly, all achievement goal theorists conceptualise achievement motivation as a multidimensional construct contrary to the conceptualisation of Atkinson (1977) and McClelland (1961) who viewed achievement motivation as a unitary construct. Thirdly, goals in all achievement goal theories are seen as determinants of achievement behaviour, cognitive, affective, and behavioural outcomes. A final commonality shared by these theories is that individuals define success and failure in terms of goal attainment.

An issue of differentiation that should be touched upon is the conceptualisation of ability in Nicholls' theory and how it is compared to other achievement goal theories. Nicholls has not been concerned with the nature of ability. Specifically, Nicholls' focus is not whether ability is viewed as inherent or acquired, but rather the focus is on the relationship between ability and effort. However, Dweck viewed the ability as acquired or fixed skill and as an inherent aptitude, in contrast to Nicholls' conceptualisation of ability.

Another issue still concerns ability beliefs, but touches upon the direction of causality in the association between ability beliefs and achievement goals. Nicholls believed that the perception of ability individuals employ depends on their goals, or else on their definitions of success and failure in a particular environment (Nicholls, 1984, 1989). In his theory the direction of causality is clearly from adopted goals to the attribution of success and failure. A task-involved individual will be more focused on learning and will more likely attribute success to effort and development of the ability. Ego-involved individuals focus on bettering others and are more likely to attribute their success to higher ability. On the other hand, Dweck (1986) believed that it is the incremental or entity beliefs about their ability that will lead these individuals to adopt certain goals. Goal orientation is in that case a function of the nature of intelligence. Children hold different theories about how ability and intelligence change over time.

Carol Dweck and her colleagues (Dweck, 1975, 1986; Dweck & Elliot, 1983; Dweck & Leggett, 1988) combining implicit theory with achievement goal theory tried to explain why individuals would pursue different goals. Dweck has mostly worked with children in the academic domain and explained that children hold two conceptualisations of intelligence. The first conceptualisation comprised the belief that intelligence is global and stable. This fixed entity conceptualisation of intelligence leads children to adopt a performance (ego-involving) goal and consequently develop a maladaptive helpless response. The second conceptualisation consisted of a more malleable view of intelligence leading to the adoption of a learning (task-involving) goal, which develops adaptive mastery-oriented responses. Therefore, in Dweck's

theory the direction of the relationship between ability beliefs and goal orientations is clearly from the former to the latter. An individual holding an entity belief views intelligence and ability as generally stable; this guides him/her to become ego-involved and be concerned with how his/her ability is evaluated compared to other individuals. In contrast, an individual holding an incremental belief views intelligence and ability as changeable. It is more likely that this individual will adopt a task-involving goal, and with the exertion of effort in learning and mastering a skill will try to develop his/her ability.

A second issue pertains to the orthogonality of the goal perspectives. That is, whether task and ego orientation are two opposite ends of the same construct if conceptualised in a continuum, and as a consequence an individual cannot possess high task and high ego orientation; or whether they are two different constructs, thus an individual can experience high task and high ego orientation at the same time. In Nicholls' theory an individual can hold high task- and high ego-achievement goals at the same time. Thus, the two goals are two different constructs. Research that has utilised Nicholls' framework has confirmed this assumption. On the contrary, in Dweck's theory, goal perspectives are considered bipolar, contradicting Nicholls' arguments on the orthogonality of achievement goals. An individual who is highly task-involved cannot be highly ego-involved at the same time.

Summarising Nicholls and Dweck's theories, both studied goals in relation to beliefs about ability that played a key role in their models of motivation. The main dissimilarity lay in the placing order of the goals and ability beliefs. Nicholls, by placing goals before ability beliefs and suggesting that contextual cues might influence the involvement goal an individual is likely to adopt, viewed achievement goals as more unstable (Nicholls, 1989). Dweck suggested that goals are the result of relatively stable beliefs about the nature of intelligence, resulting in a view of goals as more stable (Dweck & Leggett, 1988).

Nicholls differed from earlier theories that identified three goals operating in achievement settings (Maehr, 1984; Maehr & Nicholls, 1980). The three proposed goals of task, ego, and social orientation bear similarities to McClelland (1961) and Atkinson's (1964) needs for Achievement, Power, and Affiliation. Maehr and Nicholls (1980) stressed the individual differences in the definitions of success and failure. These definitions, they argued, were based on the attributional meanings individuals attached to success and failure. According to the individual's attributional style, he/she could be categorised as ability-oriented (ego), task-oriented or social-oriented. With respect to ability-oriented goals, the individual's major concern focuses on demonstrating and maintaining high ability and minimising the probability

of demonstrating low ability. The athletes who adopt the ability-oriented goal are merely concerned with achieving in the sport and with how well they achieve relative to their peers. Their focus is on winning and how their ability in winning is ranked amongst their peers. The attribution of success in objective criteria, thus in high ability, is seen as success and leads to positive emotions and expectation of future success in similar situations. Individuals who are ability-oriented will be more likely to choose difficult tasks and exhibit greater persistence in the face of difficulty. On the other hand, when losing is attributed to low ability, it is equated to failure and results to negative emotions and expectations of future failure in similar circumstances.

With respect to the second type of goal, the task-oriented goal, the individual's concern is on the task at hand and on developing competence and focusing on improving and mastery. This goal is oriented towards the process rather than the outcome. Maehr and Nicholls stated that perceptions of ability in this goal involvement state are of no importance, since they are assumed to be high by the individuals. The individuals who adopt a task-oriented goal focus on how to best approach the task at hand and which strategies should be employed to best assist in mastering the content. Since attributions to ability are not relevant so is the comparison with the peers' performance at the task.

The third type of goals that can be adopted by the individuals is social approval-oriented goals that represent an individual's beliefs and perceptions about the social reasons for trying (or not trying) to achieve. These goals refer to behaviours that attempt to maximise the probability of demonstrating virtuous intent and personal commitment, thereby gaining social approval from others for these intentions. This virtuous intent was suggested to be inferred from the amount of effort expended which was in turn under the voluntary control of the individual.

The latter goal received little attention in the sport psychology literature. In their study, Nicholls, Patashnick, and Nolen (1985), developed an instrument to measure goals: the "Ego and Social Orientation" scale. In this scale, social and ego goals were merged and studied together. Nicholls in his later work regretted approaching the study of social and ego goals from this perspective, and did not incorporate social goals into his subsequent work. In the sport domain, a study by Vealey and Campbell (1988) investigated the influence of goal orientations as conceptualised by Maehr and Nicholls (1980) on pre-competition self-confidence, pre-competition anxiety, and actual performance of 106 young adolescent figure skaters. Their results verified the two-factor solution of the "Ego and Social Orientation" scale. The two orientations they found were task and a combined ego orientation and social approval.

A recent attempt to revive social goals has been made by Urdan and Maehr (1995) who identified different types of social goals including a) social approval, b) social compliance, c) social solidarity, and d) social concern goals and argued that cognitive and behavioural outcomes associated with the pursuit of social goals depend on a) type of social goal, b) values of social targets, c) meaning and achievement situation, and d) goal coordination. They advocated that achievement goal theorists should incorporate social goals and their relations with antecedent and various achievement outcomes into their research agenda. Stuntz and Weiss (2003) found that in certain peer contexts, social goal orientations influenced unsportsmanlike play responses above and beyond the contribution of task and ego goal orientations.

Until now achievement goals have been studied as more or less stable constructs stemming primarily from dispositional orientations (Dweck, 1984; Dweck & Leggett, 1988; Maehr & Nicholls, 1980; Nicholls, 1989). Although the role of situational cues played an important role in these theories, in Ames' (1992a; 1992b) theory they played the leading role in influencing individuals' goal involvement, affect, attributions, and behaviour.

Overall Nicholls' theory has been proven to provide a more flexible interpretation of the dispositional goal perspectives, leaving space in his theory for situational influences. His perspective of achievement involvement incorporates distinct components in terms of goal orientations, situational orientations and goal involvement. Thus, although goal orientations are seen as trait-like dispositions, but not stable personality traits, they are malleable to change according to the situationally emphasised cues, and collectively these two constructs will produce the end result, the adoption of the goal. Additionally, since an individual can be focused both on mastery and learning and on performance goals at the same time, the theory can be more easily applied to competitive environments that very often facilitate ego-involvement through social comparative and evaluative procedures.

2.1.2.1 States of Goal Involvement

Nicholls' (1989) highlighted that whether a person is in a state of task- or ego-involvement depends on dispositional and situational factors. A person's goal orientations interact with the task- or ego-involving features that are reinforced in the achievement environment to produce the goal involvement state, which are the actual goals exhibited and manifested in the individual's achievement behaviour. Nicholls' work has predominantly been concerned with the influence of dispositional orientations that he termed goal orientations on achievement behaviour. According to Nicholls' (1989) theory, a task-oriented person entering an Olympiou 2006

achievement situation is expected to be task-involved and to use the undifferentiated conception of ability and self-referenced criteria to assess the demonstrated competence and success in the task. An ego-oriented individual is expected to exhibit ego-involvement. Previous experience and performance will be recalled to evaluate how much mastery has improved and how much effort has been expended. An ego-oriented person entering an achievement situation is expected to be ego-involved and to use the differentiated conception of ability and normative criteria to assess competence and success in the task. Previous performance and experience will be compared to other competitors' performance to evaluate ability, and one of the criteria of success will be victory—especially when less effort was expended.

Perceptions of competence (ability) are inherently linked with goal involvement. For a task-oriented person the conception of ability will be undifferentiated and the adopted goal will be the demonstration of mastery, so ability is not relevant to the outcome produced. High- or low-perceived ability individuals in a task-involved state will experience adaptive cognitive, behavioural, and affective patterns of achievement. Perceived ability becomes relevant in the state of ego-involvement. In this state the differentiation of ability from effort leads to the demonstration of higher ability relative to others with a lower exertion of effort. Ego-involved individuals with low perceptions of ability will report maladaptive achievement behaviours, whereas ego-involved individuals with high perceptions of ability will report adaptive patterns. Harwood (2002) stressed the importance of studying and assessing the actual goal states as this “offers substantially greater ecological validity and primary material for possible intervention options” (p. 107).

The conceptualisation of achievement goal states in terms of task and ego involvement has received criticism as well. Harwood, Hardy, and Swain (2000) argued that task- and ego-involvement do not result from the differentiation of ability. They stated that “differentiation of ability is a bipolar construct or process. One has either a tendency to differentiate or one does not. One cannot have a tendency to both differentiate and not differentiate.... At age 12, children understand that ability is not effort and that the current capacity of their skills will always limit their ability to demonstrate competence no matter how hard they work. In our opinion, nothing can ostensibly reverse the attainment of this cognitive-developmental level” (p.241). However, according to Nicholls' theory, ability is not a bipolar construct, as is the case in Dweck's theory.

Roberts (1997) mentioned that once the differentiated conception of ability has been accomplished, one can choose to differentiate or not. When one reaches the stage of differentiation, a choice is made to focus on effort and ignore the demonstration of ability. He added that individuals may hold different conceptions of ability for tasks and domains, or even shift the focus from one conception of ability to the other for the same task at different points of time.

A second debate evolved around Harwood, Hardy, and Swain's (2000) introduction of a third state of involvement which they termed 'self-referenced, ego-involvement'. They explained that this state involves an individual competing against him- or herself. Roberts (2001) commented on this point by addressing and invoking the nature of the competition. He stated that a competition involves the presence of others. Normative criteria of success involve the evaluation of one's performance relative to other people, not relative to oneself. For example, athletes who compete in individual sports may try to surpass their own previous records; even if they do not succeed they might still win the competition. Roberts (2001) elaborated: 'When you evaluate your performance relative to your own previous performance, you are not engaging in normative evaluations with present others; therefore you are not invoking ego-involving comparisons' (p. 14).

Very few studies have been conducted in the sport domain to assess the states of goal involvement. The majority of the literature has concentrated on the investigation of goal orientations (e.g., Berlant & Weiss, 1997; Carpenter & Yates, 1997; Chi & Duda, 1995; Duda, 1988, 1989a, 1989b; Duda, Olson, & Templin, 1991; Duda & White, 1992; Harwood, 2002; Harwood & Swain, 1998; Van Yperen & Duda, 1999) and the situational climate (Balaguer, Duda, & Crespo, 1999; Balaguer, Duda, Atienza, & Mayo, 2002; Ebbeck & Becker, 1994; Fry & Duda, 1997; Kavussanu & Roberts, 1996; Kuczka & Treasure, 2005; Miller, Roberts, & Ommundsen, 2005; Newton & Duda, 1999; Newton, Duda, & Yin, 2000; Seifriz, Duda, & Chi, 1992; Walling, Duda, & Chi, 1993). Even when researchers have adopted the interactionist approach, assessing both dispositional and situational goals, interaction between the goals has not been utilised to suggest the actual state of involvement, but rather the impact of any one of the goals, whether dispositional or situational, on various outcomes (e.g., Balaguer et al, 2002; Gano-Overway, Guivernau, Magyar, Waldron, & Ewing, 2005; Kavussanu & Roberts, 1996; Whitehead, Andrée, & Lee, 2004).

The studies that have examined the states of goal involvement in sport are very limited (Harwood & Swain, 1998; Swain & Harwood, 1996; Williams, 1998). Due to the difficulty of

the study's design not many studies can be conducted during the competitive game. For example, Swain and Harwood (1996) examined the separate and interactive contribution of goal orientations with situational criteria on the prediction of state goals within the pre-race environment for 214 swimmers. It was shown that swimmers who valued the race outcome placed great importance on an ego-involved goal and at the same time recognised the importance of a task-involved goal. Swain and Harwood explained that a high task-, high ego-involved swimmer cannot fail to be satisfied once they perform well. In the case of swimming well but losing, the task-involved goal will act as a 'satisfaction guarantor'. It was further shown that social or personal perceptions of ability correlated positively with ego-involvement. Swimmers perceiving high self-efficacy and efficacy expectations provided by significant others, also perceived a strong state of ego-involvement. This initial attempt to measure goal involvement is very encouraging, and especially the fact that this was one of the very few studies that have been conducted in the 'heat' of the race (1 hour before competition) gives extra value to the study. The measurement of state involvement was however conducted through single items, which is not sufficient as internal reliability cannot be provided.

In another study, goal involvement has been measured by the Goal Involvement in Sport Questionnaire (GISQ; Williams, 1998). The 13-item GISQ was used to measure pre-practice and pre-game goal involvement (i.e. the conception of ability used in a specific situation). The items of the GISQ were identical to the items of the Task and Ego Orientation in Sport Questionnaire (TEOSQ), with only the stem altered to "I will be most successful in this softball game or practice if I ..." instead of the "I feel most successful in softball when ...". Reliability estimates were 0.86 and 0.76 for pre-practice and pre-game goal involvement respectively. Williams tested the hypothesis that the reward structure would influence athletes' goal involvement and state anxiety. Results showed that athletes in games reported higher cognitive and somatic state anxiety and were less task involved than in the practice sessions. Although their state anxiety increased in the games, athletes were not more ego-involved than in the practice sessions. Surprisingly, it was shown that 4 out of the 9 teams were more ego-involved in practice than in games.

Harwood, Hardy, and Swain (2000) heavily criticised the assessment method of the state of goal involvement. They stated: '... altering the TEOSQ stem to transform it into a precompetition state measure ... undermines the integrity and sophistication of the theory. The limitation of the transformation approach is exemplified by the rationale of an item such as "I will feel most successful in this next competition when...I learn something that is fun to do"...

the relevance of this item in effectively assessing the intensity of a self-referenced conception of achievement in competition is clearly questionable.’ (p. 250).

Additionally, the examination of goal states during competitive games is not simple due to the fact that goal-involvement states are ‘dynamic and multifaceted’ (Duda & Whitehead, 1998). An individual’s goal state involvement might fluctuate in the period before, during or after the competition. Duda and Whitehead (1998) argued that “task involvement and ego involvement are considered to be reflective of transitory goal states or distinct ways in which we process an activity at any moment in time” (p. 22). Harwood et al. (2000) added that the measurement of goal states might also depend on the type of sport, and they might fluctuate even during the game or competition.

In conclusion, although significant attempts have been made to assess athletes’ goal states, there is still room for improvement and further research is warranted.

2.1.2.2 Goal Orientations

As previously mentioned, dispositional tendencies play a vital role in whether an individual will be in a state of task- or ego-involvement. Achievement goals were specifically developed to explain achievement motivation and behaviour. Nicholls (1989) has explained that task and ego orientation involve much more than the definition of a task or ego motivational goal. He suggests that they reflect the individual’s view of the world, going to the reasons why people get involved in an achievement task. In this context, goal orientations represent more general orientations to a given task that embrace a number of related beliefs, purposes, and standards. They refer to the proneness of the individual to employ a differentiated or undifferentiated conception of ability.

The greatest strength of Nicholls’ theory concerning the nature of goal orientations lies in the fact that is domain specific. The individual’s achievement strivings in sport are not necessarily generalisable to the social or academic domains (Weiss, McAuley, Ebbeck, & Wiese, 1990). An individual can for example be ego-oriented with regard to a certain sport but task-oriented with regard to school courses.

The measurement of goal orientations in sport was initiated by Duda and Nicholls (1992) with the development of the Task and Ego Orientation in Sport Questionnaire (TEOSQ). In line with Nicholls’ theory, Roberts and Balague (1989) developed the Perceptions Of Success Questionnaire (POSQ). In both questionnaires (TEOSQ and POSQ) the two hypothesised goal orientations were found to be orthogonal with low to moderate and positive correlations (Chi & Olympiou 2006

Duda, 1995; Roberts, Treasure, & Kavussanu, 1996). The literature on goal orientations in sport has flourished and has been productive and proliferate.

Goal orientations and cognitive outcomes. Goal orientations have been found to relate to purposes of sport and physical education. An individual's goal perspective has been found to be consistent with his or her views about the meaning of the activity and the purpose of the activity. Duda (1989) reported that task-oriented male and female high school athletes felt that the purpose of sport was to enhance self-esteem, teach people to try their best, cooperate, and be good citizens. Walling and Duda (1995) found that high school students who were high in task orientation and high in ego orientation perceived that the purposes of physical education were to promote mastery and cooperation, develop an active lifestyle, promote competitiveness, enhance self-esteem, teach health and fitness, develop motor skills, learn rules, and provide fun. Vlachopoulos and Biddle (1997) found that task orientation was positively associated with perceptions of success for physical education students and that this relationship was not moderated by perceived ability. In terms of the role of goal orientations on beliefs about the causes of success, research findings suggest that there is a logical congruence between the goals emphasised and the views about what is necessary to achieve success. Generally, it was shown that task orientation related positively with the belief that one must work hard and cooperate with others in order to achieve success; ego orientation was also found to relate with the belief that being athletically able is a critical antecedent to sport achievement (Duda, Fox, Biddle, & Armstrong, 1992; Duda & Nicholls, 1992, Duda & White, 1992; Guivernau & Duda, 1994; Hom, Duda & Miller, 1993; Newton & Duda, 1993, Newton & Fry, 1998; Roberts & Ommundsen, 1996; Treasure & Roberts, 1994, 1998; VanYperen & Duda, 1999; White & Duda, 1993). White and Duda (1994) found that task orientation coincides with more intrinsic and cooperative reasons for becoming involved in sport, whereas ego orientation relates to more extrinsic motives for sport participation.

Goal orientation and motivation. The impact of goal orientations on athletes' motivation has been well documented (Duda, 1992; Duda, Chi, Newton, Walling, & Catley, 1995; Lochbaum & Roberts, 1993). For example Duda (1995) found that task orientation correlated significantly with the overall intrinsic motivation score of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989). Kim and Gill (1997), focusing on Korean youth sport, found that task orientation was significantly associated with the three dimensions of intrinsic motivation—Enjoyment/Interest, Perceived Competence, and Effort/Importance—whereas no negative relationship was found for ego orientations and indices of intrinsic motivation. In

another study, Kim, Williams, and Gill (2003) compared Korean and USA athletes and found that USA athletes scored higher in task orientation and lower in ego orientation than Korean athletes. Although no significant correlations were found between ego orientations and intrinsic motivation, for the Korean athletes the relationship was low but positive, indicating that their ego orientation was more adaptive.

Goal orientations and moral functioning. Achievement goals have been shown to have important implications on moral functioning in sport. The relationship between goal orientations and issues of morality has been examined by numerous studies (Duda, Olson, & Templin, 1991; Dunn & Dunn, 1999; Kavussanu & Roberts, 2001; Todd & Hodge, 2001). These studies showed that task orientation was associated with sportspersonlike attitudes such as social conventions and personal commitment to sport, while ego orientation was found to be related to approval of intentionally injurious acts. Task orientations were found to positively predict sportspersonlike attitudes (Lemyre, Roberts, & Ommundsen, 2002). The specific impact of ego orientation was studied by Kavussanu and Ntoumanis (2003). Specifically, they examined the mediating role of goal orientation in the prediction of moral functioning from participation in contact sports. Structural equation modelling results indicated that participation in contact sports positively predicted ego orientation, which in turn predicted low levels of moral functioning. Task orientation was found to predict high levels of moral functioning. The authors conclude that contact sports are more likely to enhance ego orientation because of their interactive nature, but encouraging athletes to use self- rather than other-referenced criteria of success could alleviate the potentially negative effects of extensive involvement in these sports on moral functioning.

Goal orientations and affect. Ntoumanis and Biddle (1999), in a meta-analysis of goal orientations and affect using 41 independent samples from the physical activity context, reported that task orientation related moderately to high but positively with positive affect, while low to moderately and negatively with negative affect. Ego orientation was found to be correlated low and positively with positive and negative affect. In the sport domain, ego orientation has been associated with higher anxiety (Duda & Gano-Overway, 1996; Spink, 1995; Tank & White, 1996; White & Zellner, 1996). Ommundsen and Pedersen (1999) found that task goal orientation and high-perceived sport competence predicted a reduced tendency to report cognitive anxiety when competing in sport. But perceptions of competence did not mediate or moderate the relationship between goal orientations and cognitive and somatic trait anxiety. Ego orientation was not found to associate with indices of anxiety, which is in contrast

with Hall and Kerr's (1997) finding on two occasions that ego orientation contributed significantly to the prediction of cognitive anxiety prior to competition. Hall, Kerr, and Matthews (1998) also showed that task and ego orientations significantly contributed to the prediction of cognitive anxiety and confidence.

Goal orientation and performance. Goal orientations have been shown to affect performance. Task orientation was found to positively relate to performance outcomes, whereas ego orientation coupled with low perceived ability was negatively related to sport-related performance (Chi, 1993; Kingston & Hardy, 1997; Sarrazin, Cury, & Roberts, 1999; VanYperen & Duda, 1999).

Overall, results from the studies that have looked at task and ego goal orientations independently from each other indicated that task orientations result in adaptive responses, whereas ego orientations result in maladaptive responses. This approach however, tends to look at the goal orientations more as bipolar constructs and is not consistent with the tenets of achievement goal theory. Since Nicholls (1984, 1989) proposed that task- and ego-involving goals are orthogonal, researchers have focused on analysing goal profiles (Fox, Goudas, Biddle, Duda, & Armstrong, 1994). Biddle (2001) emphasised that a combined analysis of goal profiles might yield different results than separate analyses of the two goals independently. Researchers have either used the median split to divide individuals into four groups, high-task/high-ego, high-task/low-ego, low-task/low-ego, low-task/high-ego, or used other techniques such as discriminant analysis or cluster analysis to classify individuals in goal profile groups. Hodge and Petlichkoff (2000) used cluster analysis to divide 257 rugby players into low-, moderate- and high-task and ego goal-oriented groups. Results indicated that players with low-ego and moderate-task goal orientations reported significantly lower levels of perceived rugby ability/competence than players with high-ego and moderate-task goal orientations. Duda (2001) suggested that goal-profile approach should be used when the classifications can be generated on the basis of extreme groups and there is an interaction effect, or when the in-depth qualitative analysis and/or interventions will follow the profile classification of subsamples.

According to the tenets of achievement goal theory, although studies focusing on goal orientations offer important and significant information on the role of individual differences on goal states, it is the actual adoption of a goal that will lead the individual to a certain behaviour, and cognitive and affective response. Thus, researchers should also consider the role of the

environment in which the athlete exercises his/her sport and ultimately measure the adopted goal.

2.1.2.3 Motivational Climate

2.1.2.4 Ames's work

The examination of the environment's impact on individuals' achievement behaviour started with the work of Ames within the academic domain. Whereas Nicholls' (1984, 1989) work has emphasised individual differences in goal orientation, Ames' theoretical framework (1984) highlighted the influence of the social context on achievement. Ames (1992) was the first achievement goal researcher to examine systematically the situational goal structure and elucidate how the learning environment can be described and explained in terms of its informational cues and how it can influence students' informational processes and cognitions about performance. The situational and environmental characteristics, the basis of evaluation and rules of interacting with others, and the goal/reward structure shape the motivational climate and influence the individual's achievement goals. In Ames' theory, these goal/reward structures were distinguished as competitive, cooperative, and individualistic.

Ames' work was conducted mainly with students from primary, junior and senior high schools. Her focal aim was to study the psychological meaning that children attribute to the situational structure of the goals emphasised by the teacher. She argued that children attribute different meanings to their environment according to their past experiences related to achievement history (Wentzel, 1991, cited in Ames, 1992a), their parents' beliefs and goals (Ames & Archer, 1987), the actual differential treatment they receive from their teacher, and specific expectations (Maehr, 1984). Most importantly though, children adopt a particular motivational orientation according to the motivational cues reinforced by the teacher in the classroom (Ames, 1992a).

To this end, based on Nicholls' (1989) achievement goal theory, Ames (1992a, 1992b), investigated the two proposed goal structures assumed to be operating in the classroom and other learning environments. She used the terms 'mastery' and 'performance climate' to reflect the task- and the ego-involving motivational climate terminology that Nicholls (1984) first utilised. In her early work, Ames explored the mastery and performance goals that were elicited by different goal structures. She identified three types of goal structures. The first type was the competitive structure, in which social comparison was evident and students would work all together, but in a negative way. That is, one's success would mean the other's failure.

Focus would be on students' own performance relative to others, and their own ability, and thus on 'ways to beat the other'. In the second goal structure, the cooperative structure, students would still work together but in a positive way, namely one's own success would be dependent on the other group members' success. Focus would be on group performance and the way to improve would be through effort. While both competitive and cooperative goal structures refer to group structures, they elicit qualitatively different goals, namely ego and task goals respectively. The third goal structure is the individualistic, in which information about other students' performance is not present and the student engages in a more self-challenging state than social comparison. Focus would be on own performance and improvement over time, and effort would be perceived as the means to achieve it. Ames' distinction of competitive and individualistic settings is very similar to Nicholls' (1989) distinction of ego- and task-involving climates, as both competitive/ego-involving contexts promote ego goals, and individualistic and/task-involving contexts promote task goals.

Ames and associates' research on students' perceptions of the social structure of the classroom had two major purposes. The first one was to provide solid and informed evidence on the existence of these goals structures, and the contribution of each one to a mastery or performance environment. The second one was to illustrate how students' experiences of these structures can lead to differential affective, cognitive and meta-cognitive motivational processes that can be adaptive or maladaptive.

Empirical evidence to prove the existence of the aforementioned aspects in perceptions of the psychological motivational climate was provided by Ames and her colleagues (Ames & Ames, 1984; Ames & Archer, 1988). In their early work, Ames and colleagues (e.g., Ames, 1984; Ames, Ames, & Felker, 1977; Ames & Felker, 1979) induced competitive and non-competitive/ individualistic situations through experimental manipulations and examined students' thoughts, feelings and reactions within those situations. Most of their studies included tasks designed around puzzle solving in solvable and unsolvable conditions, and included children from fifth and sixth grades of primary school. Children would work in pairs and against each other in the competitive situations, where social comparison was evident through information about the other's performance, and the instructor would make sure one was perceived as a winner and the other one as the loser. Children in the individualistic situations would work alone in the task; information would include their own past performance and the objective, and the criteria of success would be self-referenced and directed to the improvement of their own performance. Ames (1986) described these structures as "reflecting different

motivational systems which result in different ways of attending to performance information, different meanings attached to success and failure, and different action consequences” (p. 233). Results from these series of studies confirmed the existence of these different goal structures that elicit qualitatively different goals. Results also revealed that the different goal orientations emphasised by the actual goal structure led to differential attributions, self-concepts, self- and other-evaluations and affect. These studies, though, did not investigate the psychological meaning that children attributed to the environment but rather the actual situational goal structure.

Ames and Archer (1988), in an attempt to describe those aspects of the classroom structure as perceived by the students that were more likely to impact on students’ adoption of a particular goal orientation, focused on the identification of the following climate dimensions: definition of success, value of effort or ability, reasons for satisfaction, teacher’s orientation, view of mistakes, focus of attention, reasons of effort, and evaluative criteria. The authors developed a questionnaire to reflect these dimensions and measured students’ perceptions of the ‘psychological climate’ of their classroom. Results showed that the way students perceived these aspects of the classroom environment reflected the respective goal orientation that the students perceived that the teachers reinforced.

With regards to the second purpose, research on students’ perceptions of the classroom climate has investigated its relation to different motivational patterns. Research conducted by Ames and Archer (1988) revealed that when students perceived a mastery goal emphasised in the classroom, they were more likely to use effective learning strategies, preferred more challenging tasks, exhibited more satisfaction with their class, and their beliefs that effort and success are related were strengthened. Focus on performance goals in the classroom resulted in children using less effective learning strategies, preference for easier tasks, less satisfaction with their class, and the belief that high ability leads to success. Results from Ames and Archer’s study highlighted the adaptive effects of the belief that effort leads to success. This belief is significant for the students’ motivation, as effort is an internal and therefore controllable factor, which once enhanced will lead to improved performance and learning. Furthermore, the belief that ability leads to success can be maladaptive for students’ motivation, as the exertion of high effort might not always lead to success, setting at risk the self-worth of the students.

Further, research by Ames, Ames, and Felker (1977) demonstrated that competitive situations elicited more ego-involving motives for success outcomes, in terms of rating oneself as more

deserving and satisfied than the other, and caused strong negative affect and self-punitive evaluations when failing. It was also shown that satisfaction was closely related to ability and luck attributions in the competitive situation, while in the non-competitive situation satisfaction was related to effort attributions. These results confirmed Nicholls' suggestions that a competitively oriented setting would stress social comparison and therefore undermine the relationship between effort attributions and affect.

As explained earlier, ability beliefs are central to achievement goal theory, and their study is essential as they are the main tool by which children explain their success and failure in a competitive context. Within Ames' work, ability has been investigated under the term of self-concept, reflecting a set of beliefs and feelings about one's capabilities. A more extensive investigation on students' self-concept was conducted by Ames and Felker (1979). Results of this study showed that high self-concept students (i.e., those more confident about their abilities in school-related experiences) attribute their success to their skill, in comparison to low self-concept students (i.e., those less confident about their abilities in school-related experiences) who attributed their success to the factor of luck. Failure, though, was attributed to lack of skill by both high and low self-concept students. High self-concept students felt that they deserved and indulged in more rewards for their success, whereas low self-concept students responded with more punitive statements after experience of failure. These results have important implications for the students with low self-concept who perceive the classroom structure as performance/ego-oriented. Students who fall in this category are more likely to perceive the social comparison and a possible failure as threatening to their self-worth, due to their perception of ability and success as covariates. In this study the goal structure was ambiguous in the sense that, although children participated in an individualised structure, the information conveyed involved the performance of others in terms of their ability and luck.

Ames (1984) tested Nicholls' (1989) theory of task- versus ego-involving goals as they were manifested in individualistic (i.e., non-competitive) and competitive situations. Results from her study provided support for Nicholls' contentions. Children in the competitive situation attributed success to ability, thus promoting a ego-involving goal. Children in the individualistic situation attributed success to effort, thus leading to the adoption of a task-involving goal. In contrast to Ames et al.'s (1977) study, ability attributions were strongly related to positive affect to both contexts, competitive and individualistic, following high performance; whereas the relationship between negative affect following a low performance was low in both the individualistic and competitive structures. In her later work, Ames

transferred her attention from the construction of the goal structures to the cues promoted in the setting under study.

Ames (1992a, 1992b) argued that how task and learning activities are designed in a classroom context, what type of evaluation techniques and rewards the teachers employ, and teachers' orientation, all constitute features of the classroom structure that promote certain goals to the students. A brief description, according to Ames (1992a, 1992b), follows of how each of these aspects of the environment elicits different motivational climates.

When tasks are characterised by variety and diversity and aim at attracting students' interest, they are more likely to make a mastery climate salient to the students. Moreover, tasks that are designed to provide challenge and meaningful reasons to engage in the activity create an intrinsic purpose to learning. Lastly, tasks that are organised so that they can be accomplished through specific and short-term goals seem to enhance students' belief that by trying hard they can reach their goals. On the other hand, when tasks do not include novelty or variety, or are unreasonably difficult to achieve, and students cannot understand the meaning of the activity, then the task structure is assumed to promote a performance motivational climate.

Regarding the impact of the authority figure, which in this context is the teacher, Ames (1992a, 1992b) contends that when teachers are perceived to support autonomy and provide students with options and choices in decision-making, method, and pace of learning, it is assumed that they create a mastery environment. On the contrary, controlling teachers, who do not offer choices and options or offer some choices and options to certain students, and who use rewards and other external strategies to make students engage in the activity, support a performance-oriented climate.

Additionally, in a mastery climate teachers' use of evaluation criteria focuses on students' improvement and progress and is made in private so as not to make salient social comparison. Evaluation in a mastery climate aims at informing students about their performance and provides them with the opportunity to improve. Performance climates are product- and performance-oriented, focusing on the quantity of work rather than quality of learning. Teachers in such climates use social comparison and normative evaluation through for example public announcement of the student's grades, and emphasise winning and surpassing other students and generally outcome based criteria. Evaluation in this case is normative and is used by teachers in order to control the students.

Close to evaluative criteria lies the salient aspect of teacher's recognition of the students. A mastery climate is reinforced by the teacher providing equal opportunities for recognition of

students' efforts. Teachers give students opportunities for improvement and view mistakes as part of the learning process. In a performance climate, mistakes are punished, and are indicative of low ability. Teachers recognise only the more skilled students and praise them more frequently than the rest.

Finally, the way that teachers deliver the task is assumed to accentuate certain motivational cues. Teachers who use grouping strategies as part of learning in conjunction with a challenging task are more likely to promote a mastery climate and students' active involvement in the learning process. A performance climate is more closely tied with individualistic structures, where students work alone, try to surpass their classmates, and their role in the learning process is more passive, resulting in less strategic thinking and the actual recall of the task.

Ames (1992a, 1992b) theorised that when all these aspects of the environment were in agreement a particular goal orientation would be adopted. In contrast, when certain aspects of the environment emphasised differential motivational cues then students' motivation would be confused. For example, if the design of the task reinforces mastery cues, in the sense that it promotes variety and diversity, and is challenging and interesting, but evaluation focuses on performance criteria and social comparison, then the negative aspects of the performance cues will undermine the mastery ones.

Overall, the work of Ames and her associates sheds light on the study of the classroom structure in the educational domain. In several studies, children's self-attributions of ability and effort and their perceived satisfaction with their performance were examined in two main settings: competitive and non-competitive structures (Ames, 1978; Ames & Ames, 1981; Ames et al., 1977). Competitive situations accentuated the attribution of success to high ability and the attribution of failure to low ability even if the competitors performed equally well. By identifying the main components of the environment most likely to affect students' differential motivational patterns, design and implementation of experimental classroom interventions can help enhance the quality of students' experiences in a mastery environment and promote subsequent adaptive motivational patterns. In Ames, Maehr, Fisher, Archer, and Hall's (1989) study, it was shown that teachers were more likely to adopt strategies that were similar to their own goal orientations and belief systems in an intervention program that offered both mastery and performance goals. Thus, Ames (1992a, 1992b) robustly argued that for intervention programs to have long-term effects one needs to focus on the wider structure in the system. For example, if a child is subjected in multiple goals emphasised by different teachers it is not as

yet clear what kind of goal the child will adopt. Researchers believed that changing the way teachers deliver the lesson and the focus on which learning strategies they use and what they were aiming at changing, and leading the implementation of the intervention into all aspects of the classroom routine and all curriculum areas, could have a pronounced effect on children's learning, belief systems and quality of experience.

The greatest strength of Ames' work resides in the introduction of a practical tool that psychologists can use as a guide for their interventions, encapsulated in the acronym TARGET. The main principles of TARGET concerning classroom climates were first introduced by Epstein (1989). This tool was based on the assumption that the choices teachers make about certain alterable elements of a lesson in the classroom determine the degree to which the students perceive the instructional climate as more task- or ego-involving.

TARGET acronym is formulated from the initial letters of the six areas identified in the educational domain that are most receptive to psychological intervention: task, authority, recognition, grouping, evaluation, and time. Psychologists should aim at educating the teacher to change the design of the task, its delivery, the recognition and the evaluation processes and the grouping strategies and the time and pace of learning offered to the students. A mastery approach can be endorsed if the teacher focuses on learning and mastering skills and the task at hand, promotes and recognises high effort rather than outcome, and judges success in terms of effort exerted. The promotion of a sense of choice and control by the students and their active engagement should generate positive affect and attitudes towards learning. Mistakes, if viewed as part of the learning process, enhance students' learning and positive experiences. Moreover, attributions of failure to low effort instead of ability or luck are considered critical for motivated behaviour. Failure attributed to effort can lead to enhancement of one's performance, as effort is perceived to be a controllable factor by both the teacher and the student and thus is within the student's limits to improve by just putting in a little more effort. Feelings of personal responsibility are enhanced and control over the task, learning or other activity is awarded to the student. Mastery climates conclusively, promote a motivation to learn that is characterized by long-term, quality involvement in learning and commitment to the process of learning, promoting positive feelings and thought, and their endorsement should be encouraged (Ames, 1990).

Although all previous studies contributed much in advancing our knowledge on the topic of school motivational climate, certain limitations characterise these studies and should be acknowledged. The work of Ames and associates was conducted in America, raising issues of

cultural variation in the implementation of her findings to the structure of the classroom within England and other European countries. Participants in the studies and the experimental conditions involved mainly fifth and sixth grade children and some of them junior and senior high school students, thus the generalisation of the results to all age groups should be viewed with caution. Ames' experimental studies induced competitive and individualistic goal structures which are not exactly separated in real settings, where information, design, and delivery of learning normally convey both mastery and performance motivational cues. Additionally, the design of the experiments to induce task- and ego-involving climates comprised solving puzzles, an activity completely different from the compulsory nature of the school courses, thus raising issues for the applicability of her results in real and different settings.

Nevertheless, classroom contains the features and cues of an achievement situation and as such Ames (1992a, 1992b) argued that findings from the educational context could be easily transferred to any other achievement context, for example the sport context. The academic and the sport contexts share many similarities. According to Roberts (1984) and Scanlan (1978) the academic and the sport contexts are achievement environments where the demonstration of competence, the standards of excellence and the evaluation of the performance are salient and evident. Students' and athletes' performance is subjected to public evaluation; they both receive teachers' or coaches' recognition, reinforcement and rewards. Teachers and coaches, as creators of the climate structure and through their grouping strategies and design of the practice sessions, make salient their goal orientations and their beliefs about the causes of success and failure, setting certain expectations and conveying certain goals to the students or athletes. Hence one would expect that the findings from studies investigating the classroom climate and the sport climate would not differ very much. Although the study of sport structure in terms of individualistic and competitive is not easily discernible in all types of sports—especially sports that include the element of interdependence, namely team sports—the identification of the aspects that promote mastery (task) and performance (ego) cues is more relevant. In a team sport setting, normally athletes will practise in small or large groups and one's performance is highly interdependent on the rest of the group members' performance. Consequently, cooperative structures are generally more likely than competitive goal structures to operate in the team.

2.1.2.5 Duda's work

Whereas the work of Ames and her colleagues (Ames, 1984; Ames & Ames, 1984; Ames, Ames, & Felker, 1977; Ames & Felker, 1979) examined the role of group structures in achievement situations of the educational domain, in shaping children's attributions of success and failure and affective reactions to success and failure Duda (1989a) translated Ames' work in to the sport domain. Duda with her associates (1986, 1989a, 1989b, 1995, 2001; Duda & Nicholls, 1992; Newton & Duda, 1993) was the first goal perspective theorist to introduce and extend achievement goal theory from the academic to the sport domain. Therefore, based on Ames' contentions, all these elements comprising the motivational climate—namely, how the coach reacted in the team's success or failure, what the coach reinforced in training sessions, the direction of the coach's recognition to specific players or to the whole team, and the coach's reaction to athletes' mistakes—were examined in the sport domain. More specifically, Duda examined which elements emphasised by the coach were used by the athletes to understand the goals being emphasised and to evaluate success and failure in their teams. Although one attempt was conducted to observe the *actual* climate created by the coach (Chaumeton & Duda, 1988), the main objective of further studies in sport settings, from an achievement goal perspective, concentrated later not on how the coach structured the environment but how the athletes perceived it was structured.

Following Ames' experimental steps, Duda begun with the study of differences in the goal adoption of athletes participating in organised, competitive sport and athletes participating in recreational sport (Duda, 1989a). She argued that the two contexts would promote qualitatively different goals, due to the different focus on the social comparison and the athletic skill. Organised sports would be expected to place more emphasis on competitive results and evaluate players according to their ability. Recreational sport activities are less formal, entail less social comparison, and are more self-directed. The main aim is the enjoyment from participation and exercise. Results from this study were in agreement with results from the educational domain that were presented earlier, in which effects of competitive and non-competitive situations were studied (Ames, 1984; Ames et al., 1977).

Duda (1989a) examined goal perspectives by assigning 871 male and female high school students to one of the five groups based on their involvement in sport: (a) students involved in organised and recreational sport, (b) students involved in organised sport, (c) students involved in recreational sport only, (d) students who have dropped out of sports and (e) students who were never involved in sport. She presented the students with 8 hypothetical scenarios

reflecting an athlete succeeding or failing in three different situations: an individual/group, mastery/interpersonally, and competitive situation. Results showed that students from organised sports emphasised the social comparison and the mastery-based means to goal achievement more than the other groups. Dropouts, non-participants, and students from organised sports placed more emphasis on competitive outcomes than mastery accomplishments, suggesting that such individuals only continue their sport if they experience continued success.

Thill and Brunel (1995) manipulated the climate to be either task- or ego-involving in an attempt to test the effects on athletes' perceptions of ability, effort and learning strategies. Participants were 32 French professional and 24 varsity soccer players who were assigned to either a task- or an ego-involving condition and measures were taken of their levels of exerted effort. Results showed that in an ego-involving condition professional soccer players were more ego-oriented. When normative goals and standardised feedback based on social comparison were stressed then soccer players estimated that competence and effort were negatively related. On the other hand, soccer players in task-involving conditions were more task-oriented. When self-referenced goals and feedback related to improvement were emphasised then increased effort seemed to facilitate an increase in ability. Thus, soccer players in the task-involving condition reported the belief that success depends on hard work. Overall, results showed that an emphasis on normative evaluation led players to adopt a more differentiated perception of ability and effort and exert one single rehearsal and their attempts concentrated on the superficial characteristics of the task. Players reduced their "deep strategies" use and the usefulness of efforts in order to enhance their self-esteem. In a task-involving climate feedback on low competence was translated into low effort, thus to an internal changeable cause that could be easily manipulated. Consequently, positive or negative effects of learning and performance were elicited depending on the goals emphasised and the disposition orientation of the individuals.

Another study investigated the effects of multiple achievement goals on motivational patterns in 72 beginner golfers (Steinberg, Singer, & Murphey, 2000). Participants completed questionnaires measuring their intrinsic motivation, persistence, and performance and were assigned to one of two manipulation conditions. The first condition involved students who received two task-involving goals to attain which related to putting. The goals were directed towards self-improvement. The second condition involved students who were assigned two ego-involving goals to achieve. The goals were competitive in nature, namely to win at least

50% of their and their team's best balls. The third condition involved a task- and an ego-involving goal. The fourth condition was the control group, who received a list of 15 items associated with something else. Results revealed that students in the third combined task- and ego-involving goal condition reported higher task interest, perceived effort as a function of training and persisted twice as much as in the other two groups during the training period. Lastly, regarding performance, the multiple-goal group because of higher levels of enjoyment and additional practice increased their putting accuracy. The students assigned in the single task- and ego-involving conditions did not exhibit any significant changes in achievement due to the intervention.

Present findings suggest that multiple achievement goals could assist in increasing the incentive to achieve (Steinberg, Singer, & Murphey, 2000). This is in accord with Duda's (1989b) contentions about the usefulness of multiple goal orientations. She stated that a multiple goal orientation "provides the participant with mastery standards to fall back on if he or she is not the best at a specific task" (p. 103). Furthermore, Swain and Harwood (1996) have argued that a person adopting multiple goals will be satisfied, because in the case of non-attainment of one goal the other goal can act as a "satisfaction guarantor".

These motivational climate inductive studies are in line with the suggestions in the early work of Ames and Duda. In all the experimental studies conducted within the sport domain, athletes assigned to the mastery/task-involving condition (irrespective of the emphasis on the performance/ego-involving condition) reported more adaptive responses, such as more effort exerted (Steinberg et al., 2000; Thill & Brunel, 1995) and higher task interest and persistence (Steinberg et al., 2000). Athletes in a climate that emphasised both task- and ego-involving cues and athletes that have participated in organised competitive sports were shown to rely on both comparison/ego-involving, and mastery/task-involving means to goal attainment.

In subsequent studies, Duda and colleagues (Newton, Duda, & Yin, 2000; Seifriz, Duda, & Chi, 1992) developed quantitative measures to study the motivational climate as it was perceived by the athletes. A description follows in the next section of the genesis and the validation of the instruments.

2.1.2.6 Measurement of the Motivational Climate in the Sport Domain

The need to measure the motivational climate in sport was addressed by Seifriz, Duda, and Chi (1992) who modified the questionnaire used previously by Ames and Archer (1988) to measure perceptions of classroom goal orientations. In Ames and Archer's (1998) study 176 students

completed the questionnaire measuring their perceptions of the classroom climate that addressed the following topics: (a) definition of success (for mastery- or task-oriented climate: improvement, progress; for performance- or ego-oriented climate: high performance compared with others), (b) valued activities (for mastery- or task-oriented climate: effort, learning; for performance- or ego-oriented climate: normatively high ability), (c) reasons for satisfaction, (for mastery- or task-oriented climate: working hard, accepting challenge; for performance- or ego-oriented climate: doing better than others), (d) orientation of the teacher (for mastery- or task-oriented climate: how students are learning; for performance- or ego-oriented climate: how students are performing), (e) attitude towards mistakes (for mastery- or task-oriented climate: part of learning; for performance- or ego-oriented climate: cause of anxiety), (f) students' focus of attention (for mastery- or task-oriented climate: process of learning; for performance- or ego-oriented climate: own performance relative to others), (g) reason for effort (for mastery- or task-oriented climate: learn new things; for performance- or ego-oriented climate: do better than others), and (h) criteria for evaluation (for mastery- or task-oriented climate: progress, reaching absolute standards; for performance- or ego-oriented climate: normative). Although the questionnaire covered a wide variety of topics it received criticism. Nolen and Haladyna (1990) argued that although the questionnaire purported to measure students' perceptions of teachers' behaviour not all items referred specifically to the teachers' behaviour. For example, in items such as "in this class I work hard because I want to learn new things" and "in this class students feel bad if they do not do as well as others", one can assume that the referent is the student rather than the teacher, who can be seen only indirectly as the referent. A combination of items referring directly and indirectly to the teachers produces scales with unclear meaning.

Based on this measure Seifriz et al. (1992) developed the Perceived Motivational Climate in Sport Questionnaire (PMCSQ) measuring athletes' perceptions of the task- or ego-involving features emphasised in a team by the coach; although the PMCSQ did not address all the topics as in Ames and Archer's (1988) questionnaire. From an initial pool of 106 items generated by the researchers 40 items were retained by a panel of eight experts. Responses were indicated on a 5-point scale (*1 = strongly disagree, 5 = strongly agree*). The 40-item questionnaire was administered to 105 male high school basketball players, along with the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989) measuring interest/enjoyment, perceived competence, effort/importance and pressure/tension, 12 items measuring beliefs about the causes of success (Duda & Nicholls, 1992) and the TEOSQ. Exploratory factor analysis revealed a two-factor solution representing mastery (task) and performance (ego)

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climates and 21 items were retained loading clearly on one of these factors. The 21 items were subjected to another exploratory factor analysis which showed a similar structure. The reliability of the task- and ego-involving climate subscales were 0.80 and 0.84 respectively. The examination of the predictive validity of the PMCSQ included 2 x 2 ANOVA conducted with four groups (High-Task, Low-Task, High-Ego, Low-Ego) of participants scoring above or below the median of task- and ego-motivational climate as the independent variables and the subscales of IMI, beliefs about the causes of success, and goal orientations as the dependent variables. Results showed that perceptions of a task-climate significantly and positively predicted enjoyment, the composite score of IMI, and the belief that effort leads to success. Perceptions of an ego-involving motivational climate were not associated with any of the subscales of the IMI and were positively related to the belief that ability causes success. It was also shown that goal orientations were the primary predictors of enjoyment; however, when variations in perceptions of a task-motivational climate were paired with task orientations, different combination of goals enhanced or decreased the athletes' enjoyment of participation in basketball. Perceptions of ego-involving climate were the stronger predictors of tension experienced by the participants.

Further evidence on the constructive and predictive validity of the PMCSQ was provided by Walling, Duda and Chi (1993). Internal reliabilities of 0.82 and 0.80 were reported for mastery (task-involving) and performance (ego-involving) motivational climate respectively. Using confirmatory analytic techniques Walling et al. elicited an acceptable fit of the hypothesised model to the data collected from 169 young male and female team sport athletes. Although indices of fit were considered acceptable, they argued that they could have been higher and that there was still room for improvement. Predictive validity was supported through the associations between perceptions of a task-involving climate and greater team satisfaction and lower levels of performance worry reported by the athletes. Perceptions of an ego-involving climate were found to be positively related to performance worry and negatively related to team satisfaction. Walling et al. called for future investigation of the change or stability of motivational climate perceptions across a season or seasons.

While the PMCSQ measured task- and ego-involving situational cues reinforced by the coach, Newton, Duda and Yin (2000) proposed that this measurement instrument could be strengthened by conceptualising it in a hierarchical fashion. The task- and ego-involving climate subscales were then theorised to comprise other subscales determining their main characteristics and features. Newton et al. accordingly, developed the Perceived Motivational

Climate in Sports Questionnaire-2 (PMCSQ-2) and tested its factor structure, concurrent validity and reliability in two studies. In the first study, 300 items were generated and a panel of experts reduced them to 42. The 42-item PMCSQ-2 was administered to 201 female high school and collegiate volleyball and basketball players along with the initial 21-item PMCSQ and the pressure/tension of the IMI. Exploratory factor analysis to the items PMCSQ-2 that were merged with the PMCSQ items revealed a 30-item six-factor solution, collapsing the “Mistakes are part of learning” subscale with the “Effort/Improvement” subscale of the initial seven-factor hypothesised structure. The task-involving climate was thus found to comprise three dimensions: Important Role, Cooperative Learning, and Effort/Improvement. The ego-involving motivational climate was also found to comprise three dimensions: Punishment for Mistakes, Unequal Recognition and Intra-team member Rivalry. Task-involving climate exhibited an internal consistency of 0.87 and ego-involving climate 0.89. The task-involving climate subscales of important role ($\alpha = 0.77$) and effort/improvement ($\alpha = 0.83$) exhibited adequate consistency, whereas cooperative learning ($\alpha = 0.66$). The ego-involving subscales of unequal recognition ($\alpha = 0.93$) and punishment for mistakes ($\alpha = 0.80$) had adequate internal consistency whereas this was not the case for intra-team member rivalry ($\alpha = 0.66$). The three subscales and the composite of task-involving motivational climate were not associated with tension whereas the three subscales and the composite of ego-involvement climate were positively associated.

In the Newton et al.’s second study, an addition of two items for the Important Role subscale and two items for the Cooperative Learning subscale and a deletion of one item resulted in a 33-item PMCSQ-2. This 33-item version of the PMCSQ-2 was administered to 385 female national junior volleyball players along with the effort/importance, pressure/tension and enjoyment/ interest subscales of the IMI and four items measuring team satisfaction. Structural equation modelling was used to test six competing models for the factor structure of the PMCSQ-2, three orthogonal and three oblique models out of which two were two-factor two were six-factor and two were hierarchical models. Confirmatory factor analyses showed that none of the models exhibited adequate fit to the data. Post-hoc fitting included either (a) error covariances, or (b) cross-loadings, or (c) deletion of two items or (d) the exclusion of the intra-team member rivalry subscale. The elimination of the intra-team member rivalry subscale provided the best fit over all the previous post-hoc fittings. The internal consistency of the subscales ranged from 0.74 to 0.86, with the exception of the intra-team rivalry subscale ($\alpha = 0.54$). Finally, the three task-involving subscales positively predicted effort/importance, enjoyment/interest, team satisfaction and negatively predicted pressure and tension. An Olympiou 2006

opposite pattern emerged for the three ego-involving climate subscales. It was shown to positively predict pressure and tension and negatively predict the rest of the variables. Finally, Newton et al. suggested that a hierarchical conceptualisation of the PMCSQ-2 was found to fit the data best.

The measurement of the motivational climate in the sports realm, as perceived by the athletes to be created by the coach, has been translated into Spanish (Balaguer, Mayo, Atienza, & Duda, 1997), Catalan (Boixadós, Cruz, Torregrosa, & Valiente, 2004), Korean (Kim & Duda, 1998), French (Le Bars & Gernigon, 2000), Finnish (Liukkonen, Telama, & Biddle, 1998), and Norwegian (Roberts & Ommundsen, 1996).

Balaguer, Mayo, Atienza, and Duda (1997) examined the factor structure of the Spanish version of the PMCSQ-2 (Balaguer, Guivernau, Duda, and Crespo, 1997) with a sample of 181 Spanish handball players aged 17-34. Confirmatory factor analysis revealed that a two-dimensional model comprising task- and ego-involving dimensions was supported and preferred to a six subscale and a hierarchical model. The subscale of the Intra-team member Rivalry subscale demonstrated low internal consistency and dropped out of further analyses.

Consistent problems with the reliability of the intra-team member rivalry have been reported where the PMCSQ-2 has been used to measure perceptions of the motivational climate, in American (Gano-Overway & Ewing, 2004; Halliburton & Weiss, 2002; Newton et al., 2000; Treasure & Roberts, 1998) and Spanish samples (Balaguer, Mayo, Atienza, & Duda, 1997). These results point to importance of the re-examination of the psychometric properties and refinement of this ego-involving subscale in order to improve its internal consistency.

2.1.2.7 Correlates of the Motivational Climate

The literature review that follows on antecedents and outcomes of the motivational climate concentrates only on the studies that have been conducted in the domain of sport and on those studies that have utilised the PMCSQ and PMCSQ-2 as measurements of the coach-induced motivational climate. The reason behind these restrictions being that studies from a similar context and with a conceptually consistent measurement instrument will lead to better and more consistent comparisons among the results of the studies. It should also be noted that the literature review is not exhaustive as it was difficult to include studies that have not been published in English, but it has incorporated the majority of the published papers in respected and well-known journals (e.g., *Journal of Sport and Exercise Psychology*, *Journal of Sport Behaviour*, *Journal of Sport Sciences*, *Scandinavian Journal of Medicine and Sport Sciences*).

Antecedents of motivational climate. Gender differences have been reported for males' and females' perceptions of the coach-created motivational climate (White, Kavussanu, & Guest, 1998). Males compared to females reported higher perceptions of an ego-involving climate, whereas females perceived the climate as more task-involving in organised sport. Similar results were obtained by Kavussanu and Roberts (1996) in their study with 185 tennis players. More specifically, gender differences were detected in the impact of motivational climate on perceptions of self-efficacy. Female players who perceived a task-involving motivational climate reported higher self-efficacy. Male players in the same context did not report high self-efficacy. It was only after controlling for normative ability when male players reported high self-efficacy in a perceived task-involving climate. Kavussanu and Roberts argued that because males generally hold strong beliefs about their physical competence and are more secure in their own beliefs, the situational structure does not play a central role on their beliefs and thus they become less responsive to the environment. On the contrary, females who usually doubt their competence the motivational climate becomes a crucial source of self-efficacy and is beneficial to them. Other studies reported no gender or ethnicity differences in how males and females perceive the motivational climate in their teams (Fry & Newton, 2003).

Ryska and Yin (1999) examined differences in the perceptions of the motivational climate according to participation level. In their study with 157 male and 57 female soccer players performing at competitive and recreational leagues, the relationship between situational and dispositional achievement goals and perceived competence was investigated. It was hypothesised that the sport structure (i.e., recreational vs. competitive) would affect dispositional and situational goal orientations. Results from discriminant analysis revealed that competitive league players held different perceptions from recreational league players. Specifically, perceptions of a task-involving motivational climate were found to discriminate players at the recreational league, with those players holding higher perceptions than players at the competitive level. Goal orientations did not appear to differentiate players at recreational and competitive levels. Thus, these findings led to the conclusion that task- and ego-involvement in sport centres on the relative emphasis placed by coaches on the competitive outcome versus the competitive process that is significantly affected by the overall organisational structure of the sport leagues. No differences in athletes' perceptions of the motivational climate according to participation level were found in 199 basketball players (Kavussanu, Roberts, & Ntoumanis, 2002) and in 162 male handball players (Rasclé, Coulomb-Cabagno, & Delsarte, 2005).

Koenig and Butki (2000) identified differences in 129 male soccer players' perceptions of the motivational climate across three different age groups (8-9, 14-15, and 18-22 years). It was shown that younger athletes perceived a higher task- and a lower ego-involving motivational climate than older players. Halliburton and Weiss (2002) argued that age differences should be studied in relation to skill level, because it is more likely that children at a younger age would be at a less skilled level, and that as they are getting older they enter a higher skill level and more competitive leagues. In their study, no differences were found in athletes' perceptions of the motivational climate according to their skill level. It was shown though, that 13 and 14 year old athletes perceived higher levels of ego-involving motivational climate in their teams. Possibly the nature of the sport in gymnastics and its structure, which differs from other sports and especially team sports such as rugby and football in that the majority of the gymnasts reach the peak of their career at the age of 13-15 years old, produced these results. Maybe the inclusion of younger gymnasts might have unveiled greater age differences. Significant differences in how athletes perceive the motivational climate from different types of sports were not found in Ntoumanis' (2002) study with 236 players from aerobics, badminton, football, track and field athletics, trampoline, cricket, tennis, and rounders.

Very few studies have been conducted in order to study the antecedents of athletes' perceptions of the motivational climate, and the results have been inconsistent. The variety in results might be attributed to the characteristics of the sample. For example, some studies have employed a more diverse and heterogeneous sample comprising athletes from a variety of team sports in order to study gender differences (e.g., White et al., 1998), and other studies have drawn their sample from a more heterogeneous population, such as tennis (e.g., Fry & Newton, 2003). Additionally, other studies have recruited only single gender samples from a specific sport, such as female handball players, to study differences in perceptions of the motivational climate as a function of competitive level (Rasclé et al., 2005), while other studies have included both genders but in a disproportionate level (Ryska & Yin, 1999). More studies are warranted, examining various antecedents of the motivational climate that are conducted carefully in order to conform to the proper sampling techniques. Future studies would provide further information and would shed light into why previous studies have been diverse in their results.

Cognitive, affective, and behavioural outcomes of Motivational Climate

Motivational Climate and Motivation. Based on Nicholls' (1989) postulations, athletes' perceptions of the motivational climate are expected to influence their motivation. As described earlier, athletes perceiving a more task-involving climate focus on effort and learning

and mastering the activity at hand, thus are more likely to view the activity as an end and engage in it out of pure love and interest. In an ego-involving climate, athletes are more likely to focus on demonstrating their ability, and winning, thus changing the focus of their efforts from learning and mastering the task at hand to the acquisition of external rewards and cues. This situation bears more resemblance to the external regulation of behaviour than to external motivation.

Several studies have investigated the impact of the perceptions of the coach-created motivational climate on indices and types of intrinsic and extrinsic motivation. When examining indices of intrinsic motivation, researchers tended to use the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989), which assesses interest/enjoyment and pressure/tension caused by the activity/sport, perceived competence regarding the specific activity/sport, effort/importance, and perceived choice. Researchers hypothesised that athletes holding task-involving perceptions of the motivational climate would feel more competent, enjoy their participation in their sport more, exert more intrinsic interest and effort to learning and mastering the sport skills, feel less pressure and tension and feel that participation in this activity/sport was their choice. Hypotheses followed the opposite pattern when athletes held a more ego-involving perceptions of the motivational climate.

Studies approaching and conceptualising motivation based on the self-determination framework (Deci & Ryan, 1985, 2000) examined the different types of intrinsic and extrinsic motivation as a function of different situational goal perspectives. According to Deci and Ryan, an individual's motivation lies on a continuum from intrinsic to extrinsic forms of motivation and amotivation. Researchers hypothesised that athletes perceiving a task-involving climate would be more intrinsically motivated, whereas athletes perceiving an ego-involving climate would be more extrinsically motivated.

The first results of the motivational climate's influence on indices of intrinsic motivation in the context of sport were revealed in a study with 105 male basketball players (Seifriz et al., 1992). Although perceptions of a more task-involving motivational climate positively related to reported enjoyment and the belief that effort leads to success, and ego-involving climate positively related to reported tension and negatively predicted enjoyment, dispositional goals were found to better predict interest, and generally, indices of intrinsic motivation and attributional beliefs. Famose, Sarrazin, and Curry (1992) argued that dispositional goals can be better predictors of intrinsic motivation than situational goals only in the context of voluntary sports but not in a compulsory context such as school and PE lessons. Contrasting results to the

propositions of Famose et al. (1992) came from a study that examined the interaction of goal orientations, perceptions of the motivational climate and perceived ability in the prediction of various facets of motivation was led by Newton and Duda (1999). Task-involving motivational climate was found to be a better predictor of enjoyment and interest than dispositional orientations, while ego-involving motivational climate negatively predicted pressure and tension. In support of Famose et al.'s (1992) assumptions, goal orientations were the only predictors of effort/importance. No significant interaction effects between the perceptions of the motivational climate and goal orientations emerged in the prediction of different indices of motivation, while interactions between task-involving climate and task orientation positively predicted effort focused beliefs. A closer examination of the effort/importance scale predicted better by goal orientations reveals its self-reported nature of value that according to Duda and Nicholls (1992) is best predicted by dispositional goals.

Results from other studies examining the influence of motivational climate on intrinsic motivation in the sport context were similar. Kavussanu and Roberts (1996) employing a sample of 147 male and 119 female tennis players administered a set of questionnaires to measure perceptions of motivational climate, goal orientations, intrinsic motivation, self-efficacy and perceived ability. Results showed that players who perceived a more task-involving motivational climate experienced higher levels of enjoyment, effort, perceived competence, and low tension during participation in the activity. Players, who viewed the climate as more ego-involving, experienced higher levels of tension and pressure during their participation in the activity. Situational goals seemed stronger in the prediction of intrinsic motivation compared to dispositional goals.

Boyd, Gronbeck, and Yin (1997) examined the impact of perceived motivational climate on intrinsic motivation in a sample of 170 young soccer players. Results from canonical correlation analysis showed that perceptions of a task-climate and the absence of an ego climate were positively associated to perceptions of enjoyment/interest, competence and unrelated to perceptions of pressure/tension. Perceptions of an ego-climate and absence of task climate were associated positively with perceptions of competence and tension/pressure, and negatively associated with enjoyment/interest. Similar results were obtained by Newton, Duda, and Yin's (2000) study on the impact of motivational climate on the same indices of motivation and perceptions of satisfaction with the team in a sample of 385 elite female volleyball players. Newton et al. found that players who perceived a more task-involving climate were generally more intrinsically motivated. Players who perceived an ego-involving

climate were more likely to experience pressure and tension and less likely to experience enjoyment and interest and less team satisfaction.

A different approach to the study of motivation was adopted by Ntoumanis (2002) in his examination of motivational profiles with 428 British athletes participating in a variety of individual and team sports aged from 14 to 16 years. Students completed questionnaires measuring cooperative learning, unequal recognition, four types of motivation (intrinsic, identified, introjected and external regulation), and three behavioural and affective outcomes (effort, enjoyment and boredom). Cluster analysis showed the existence of three motivational profiles. The first profile was termed 'self-determined profile', wherein students reported (a) higher intrinsic motivation, identified regulation, effort, enjoyment and cooperative learning, moderate introjected regulation, and (b) lower amotivation, external regulation, boredom, and unequal recognition. The second motivational profile was termed 'moderate motivational profile' reflecting students' moderate scores on all the variables measured. The third motivational profile was termed 'controlling motivation/amotivation profile' including students with (a) higher amotivation, external regulation, boredom and unequal recognition and (b) lower introjected regulation, cooperative learning, identified regulation, intrinsic motivation, effort and enjoyment. Of particular interest is the influence of the social factors on students' intrinsic motivation. When students perceived a climate promoting cooperative learning, discouraging interindividual comparison and rewarding not only the best students, they felt more intrinsically motivated and had greater interest, exerted more effort and reported less boredom. When the students perceived low levels of cooperative learning and high levels of unequal recognition the opposite pattern was identified. A point that should be highlighted here is that in this study not all the aspects of the motivational climate were assessed (e.g., effort/improvement, important role, intra-team rivalry, punishment for mistakes). Task-involving climate was represented by cooperative learning and ego-involving climate was represented by unequal recognition, thus making it harder to generalise the results.

Results from these studies conform to the theoretical tenets described earlier (Nicholls, 1992). These studies contributed in the creation of a pattern whereby individuals who perceive a task-involving climate, namely an environment that stresses personal progress and mastery, engage in the activity out of the love of it, and consider the activity as an end in itself. In such a context individuals participate in sport for the sake of it and focus on the intrinsic rewards of learning. Thus, perceptions of a task-involving climate will promote enjoyment and intrinsic satisfaction, effort and interest and perceived competence (Boyd et al., 1997; Kavussanu &

Roberts, 1996; Newton & Duda, 1999; Newton et al., 2000; Seifriz et al., 1992). In contexts where an individual's attention is drawn to social comparison, competition and outperforming others, intrinsic interest in the activity does not flourish and an ego-involving climate will lead to more extrinsic types of motivation and more maladaptive outcomes (Ntoumanis, 2002). Individuals perceive the achievement striving as a means to an end and the main end is the demonstration of superior ability in terms of winning.

Motivational Climate and Beliefs and Attitudes about the causes of success, ability/competence, moral functioning, sportpersonship.

A basic proposition of the researchers studying the influence of contextual achievement goals on beliefs and attitudes is that perceptions of a task-involving motivational climate will produce more adaptive cognitive patterns and those of an ego-involving climate more maladaptive cognitive patterns. Nicholls (1989) argued that the different attributional beliefs held by individuals in relation to the goal structure in which these individuals operate have important motivational ramifications. When for example an athlete believes that hard work and training will help his/her development and achievement in sport, this is a more adaptive notion that can help in their long-term persistence and engagement in sport. On the other hand, perceptions that success stems from the possession of high ability can direct athletes to withdrawal, especially in low perceived ability athletes. Thus, it is expected that athletes who view the climate as more task-involving are expected to hold more effort-based beliefs, use mastery as sources of satisfaction, use self-referenced sources of competence, set self-referenced goals, embrace less rough play attitudes, and possess more positive sportpersonlike attitudes. On the other hand, athletes who view the climate as more ego-involving are expected to endorse beliefs about rough play and cheating, value the importance of winning, hold more normative-referenced beliefs about ability, and endorse unsportpersonlike attitudes.

In support of the above propositions, Treasure and Roberts (1998) found that a more task-involving climate was positively associated with beliefs that effort causes success, mastery experiences as sources of satisfaction, and social approval in a sample of 274 female basketball players. Perceptions of a more ego-involving climate were positively associated with beliefs of success attributed to ability and deception, and satisfaction from normative criteria.

Perceived ability, sources of satisfaction/interest, achievement strategies and purposes of team sport were examined in relation to motivational climate profiles in 148 Norwegian university students from team sports (Ommundsen & Roberts, 1999). Results identified the higher task- and higher ego-involving motivational climate group as the most conducive to eliciting

adaptive outcomes. Students who perceived higher task- and higher ego-involving motivational cues endorsed mastery as a source of satisfaction significantly more than the students who perceived higher task- and lower ego-involving motivational cues. Students in the higher task/higher ego climate group endorsed lifetime skills and development of social desirability as purposes of participating in sport and used the self-referenced perception of ability more than the students in the lower task/higher ego group. Ommundsen and Roberts conclude that because of the inherent competitive nature in competitive sport, the promotion of a task-involving climate in this setting may moderate the ego-involving cues created by the coach or perceived by the athletes; thus, athletes may respond with more adaptive behaviours. It is evident from this study the assumption that ego-involving criteria do not necessarily undermine adaptive responses as long as it is accompanied with high task-involving criteria.

Whitehead, Andrée, and Lee (2004) showed that when perceived ability was high in 138 male and female track-and-field athletes aged 11 to 16 years, their enjoyment was high when they perceived a task- or ego-involving climate. Additionally, athletes who perceived a higher task-involving motivational climate regardless of their levels of perceived ability reported greater enjoyment. On the contrary, athletes with lower perceived ability reported less enjoyment when they perceived a high ego-/low task-involving motivational climate.

Regarding athletes' attitudes related to fair play, perceived ability, and satisfaction with current sport involvement, a recent study examined how these constructs associated with perceptions of the motivational climate in 472 young male soccer players (Boixadós, Cruz, Torregrosa, & Valiente, 2004). Results showed that athletes who perceived a higher task and lower ego climate were more satisfied in practice sessions, held a negative rough play attitude, and had high self-referenced and low normative perceptions of ability. Athletes who scored higher in both task and ego motivational climates had positive winning attitudes, very high normative and high self-referenced perceptions of ability and were moderately satisfied during practice. Moreover, creating four motivational climate profiles using the median splits (high task/ low ego, high task/ high ego, low task/ low ego, and low task/ high ego) the researchers examined differences in satisfaction, self- and normative-referenced perceived ability, acceptance of rough play and cheating, importance of winning and enjoyment and fair play attitudes. Task-involving climate regardless of high or low ego-involving climate was significantly and positively associated with satisfaction and self-referenced perceived ability and when it was accompanied with low ego-involving climate was negatively associated with rough play and attitudes on the importance of winning. An ego involving climate was associated with higher

levels of normative ability and attitudes on the importance of winning. Similar results have been documented by Kavussanu and Roberts (1996) and Ommundsen, Roberts, Lemyre, and Treasure (2003).

Halliburton and Weiss (2002) examined the effect of perceptions of motivational climate on sources of competence information in 103 female gymnasts aged 12 to 14 years. They found that perceptions of a task-involving motivational climate were positively related to the use of effort/enjoyment and achievement of self-set goals, which were considered self-referenced sources of competence information and negatively related to the use of peer comparison/evaluation and competition performance. On the contrary, mastery motivational climate was negatively and ego climate positively associated with the use of learning/improving skills. As this finding was contradictory to the theory (Nicholls, 1989) and hypotheses, it was explained in terms of the content of the items comprising this learning/improving skills subscale that reflected a more norm-referenced skill improvement as a means of evaluating individual skill acquisition. Perceptions of ego-involving climate were negatively associated to the use of effort/enjoyment and positively associated with peer comparison/evaluation and competition performance.

A slightly different approach to the sources of sport competence was adopted by Magyar and Feltz (2003) who examined the mediating and moderating role of motivational climate in 180 young female volleyball players' sources of sport confidence. Players completed questionnaires assessing their goal orientations, perceptions of motivational climate and nine sources of sport confidence. Results supported a mediational rather than a moderational role of motivational climate on the influence of goal orientations on sport confidence sources. Specifically, perceptions of the motivational climate displayed partial mediating influence on the coach's leadership and social support as sources of sport confidence. Pearson Product Moment Correlations revealed that perceptions of a task-involving climate positively associated with mastery sources of confidence, social support and coach's leadership, whereas ego-involving climate was only negatively associated with coach's leadership as source of sport competence. Furthermore, regression analyses showed that task oriented athletes who perceived a task-involving climate created by the coach exhibited greater confidence in their ability to play volleyball as a result of their coach's ability to train them and make good decisions and lead the team. Athletes who perceived an ego-involving climate did not use coach's leadership to form their perceptions of confidence in volleyball.

Sportspersonship attitudes seem to have captured researchers' attention, turning to a popular concept of investigation which is particularly pertinent as a cognitive correlate of motivational climate. In Fry and Newton's (2003) study with 168 young tennis players it was found that perceptions of a highly task-involving climate corresponded to more positive sportspersonlike attitudes and positive attitudes towards their instructors and fellow players and enjoyment with playing for them. Perceptions of an ego-involving motivational climate were negatively associated with the endorsement of sportspersonlike attitudes and negative attitudes towards their instructors and fellow players.

Another study examining influences on sportspersonship was conducted adopting an interactionist approach between dispositional and situational goal perspectives with 202 female volleyball players aged 12 to 18 years (Gano-Overway, Guivernau, Magyar, Waldron, & Ewing, 2005). A marginally significant main effect was found only for perceptions of a task-involving motivational climate on predicting respect of the game. A three-way interaction was uncovered between task orientation, ego orientation and task-involving climate in predicting respect of the game. When both highly and less highly ego-oriented athletes perceived a strong task-involving climate in their teams, it was shown that task orientation was positively linked with respect of the game. On the contrary, only when less ego-oriented players perceived a weak task-involving climate was a positive relationship maintained between task-orientation and sportspersonship.

Following the interactionist approach, Treasure, Roberts, and Standage (1998) examined the interaction of goal orientations and motivational climate and its impact on sportspersonship utilising a sample of 431 elite male soccer players aged 12 to 18 years. Results showed that when an ego oriented player perceived a high ego-involving climate his sportspersonship in terms of respect for officials/rules and social conventions was attenuated, whereas when a low ego oriented player perceived a low ego-involving climate his sportspersonship was accentuated.

Contextual influences on moral functioning were examined by Kavussanu, Roberts, and Ntoumanis (2002) with a sample of 56 male and 143 female basketball players. Structural equation modeling results revealed that perceptions of an ego-involving motivational climate do not have a strong influence on athletes' moral functioning. A possible reason why the hypothesis was not confirmed in this study could be attributed to the different contexts within which the two constructs were measured. Moral functioning referred to a game situation-specific condition, while perceptions of the motivational climate measured the more general

atmosphere in the team. Instead athletes' perceptions of an ego-involving motivational climate were found to be positively related to the moral atmosphere in the team, namely with the coach's encouragement of inappropriate behaviours, which is another contextual factor describing the environment in one's team.

Miller, Roberts, and Duda (2003) investigated the relationship between perceptions of the motivational climate and moral functioning in a sample of 365 young male and 340 female Norwegian football players. Hierarchical multiple regression analysis showed that perceptions of an ego-involving climate were linked to lower moral cognitions and behaviours, lower moral functioning, unsportspersonlike attitudes, and lower team moral atmosphere. Perceptions of a task-involving climate predicted more mature moral functioning as well as an atmosphere in which the use of aggressive and cheating behaviour was not supported or promoted. It was also revealed that when perceptions of task- and ego-involving climate interacted, the result was low moral judgment and legitimisation of the use of physical intimidation.

Better sportspersonship behaviours and more mature levels of social-moral functioning were found in 279 Norwegian male soccer players who perceived a task-involving motivational climate (Ommundsen, Roberts, Lemyre, & Treasure, 2003). These players also perceived team norms as strongly disapproving of pro-aggressiveness. On the contrary, players who perceived an ego-involving climate were more apt to report amoral behaviours in soccer and were less likely to express sportspersonship behaviour.

Guivernau and Duda (1998) in a study with 135 male and 59 female soccer players found that team norms regarding the acceptability of injuring an opponent was negatively associated with perceptions of a task-involving climate, verifying once more the tenets of the achievement goal theory for the adaptive consequences of a task-involving motivational climate.

A general pattern of results emerged with regards to the influence of perceptions of the motivational climate on athletes' cognitive responses. Hypotheses about the task climate's impact on ability beliefs have been controversial. It has been shown that task-involving climate positively predicted self-referenced perceptions of ability and negatively predicted normative perceptions of ability, and that ego-involving climate positively predicted normative perceptions of ability, which is consistent with achievement goal theory postulations (Boixadós, et al., 2004; Kavussanu & Roberts, 1996). In these studies perceived ability was either measured with the Conceptions of Perceived Ability scale (Nicholls, 1992) or with a single item measuring athletes' physical ability. Other studies showed perceptions of both task- and ego-involving climates to positively predict competence (e.g., Boyd et al., 1997), using the IMI Olympiou 2006

subscale as a measure of perceived competence. However, in other studies, perceptions of the motivational climate were found to be minimally correlated (Ebbeck & Becker, 1994) or not correlated to perceived competence (Seifriz et al., 1992) using Harter's Competence Scale, or the IMI scale to measure competence. Lack of uniformity in the way competence was measured and a slightly different conceptualisation of the construct of competence might have led to the varying results reported.

Overall, results on moral attitudes provided support for the hypotheses. Summarising, perceptions of a task-involving climate result in more positive moral attitudes and behaviours, whereas ego-involving perceptions lead to unsportspersonlike attitudes. Task climate predicted fair play attitudes (Boixados et al., 2004), respect for the game (Gano-Overway et al., 2005), less approval of legitimate and injurious behaviour, more respect for conventions (Ommundsen et al., 2003), mature moral reasoning, and positive coach-determined moral atmosphere (Miller et al., 2005). On the other hand, ego climate predicted rough play (Boixados et al., 2004), less mature moral reasoning, pro-aggression moral atmosphere (Miller et al., 2005), strong approval of amoral behaviour, and less approval of respect for rules and officials (Ommundsen et al., 2003). In some studies ego-involving climate was not found to predict or be related to moral functioning (Gano-Overway et al., 2005; Kavussanu et al., 2002). The low ego-perceptions and the lack of variations in athletes' perceptions of the motivational climate (Gano-Overway et al., 2005) and the situation-specific nature of the instruments used (Kavussanu et al., 2002) have been provided as reasons for the failure of the motivational climate to have an effect on moral functioning.

At a more detailed level of analysis examining the different aspects of the motivational climate in predicting moral functioning, cooperative learning was a negative predictor, and intra-team member rivalry scale a positive predictor, of the intention to commit inappropriate behaviour. Punishment for mistakes and intra-team member rivalry scales negatively predicted respect for the rules. Cooperative learning was a positive predictor and punishment for mistakes a negative predictor for social conventions (Miller et al., 2005). This level of analysis is not very often reported, and it provides information on the specific aspects of the climate contributing most to the prediction of the variables of interest. More researchers should be encouraged to adopt this micro-level of analysis along with the global or macro-level of analysis (i.e., task- and ego-involving motivational climates) in order to produce a more complete and detailed picture of the relationship.

Collectively, these studies indicate that an ego-involving climate might result in athletes engaging in unsportsmanlike behaviours and dissatisfaction with the coach. It was suggested that a task climate should be fostered so that positive attitudes would be endorsed by the athletes, adding to their social and moral development (Fry & Newton, 2003). Ommundsen et al. (2003) argued that encouragement of a task-involving climate may urge the players “to see their opponents primarily as co-creators of an experience that enables both parties to see competition as a process of striving with, not against others” (p.408). In contrast, the creation of an ego-involving climate by the coach, where a ‘win at all costs’ attitude is emphasised, will urge players to be more willing to use any means necessary to demonstrate normative ability and beat the opponents. Nevertheless, it was suggested that an emphasis only on task-involvement will not enhance sport morality, but a re-evaluation of how coaches define success and failure and the ways that they convey these meanings to their players should be considered and implemented (Miller et al., 2004) as this picture reflects the coach’s values and priorities (Kavussanu et al., 2002).

A last point that should be emphasised is that an ego-involving climate is not necessarily detrimental for achievement related cognitions and affect once it is coupled with perceptions of a high task-involving climate (Boixados et al., 2004; Kavussanu & Roberts, 1996; Ommundsen et al., 2003). This was clear from the use of motivational climate profiling, which revealed that in the case of perceptions of high levels of task climate, and irrespective of high or low levels of ego climate, maladaptive cognitive responses will follow. As long as coaches ensure the existence of a strong task-involving motivational climate, players are more likely to endorse positive moral attitudes.

Motivational climate and goal orientations.

All the achievement goal theorists (Ames, 1992a, 1992b; Duda, 1992, 2001; Dweck, 1999; Dweck & Leggett, 1988; Maehr & Braskamp, 1986; Nicholls, 1984, 1989; Roberts, 1992, 1997) concur that both dispositional (i.e., goal orientations) and situational factors (i.e., motivational climate) affect individuals’ goal involvement. Dweck and Leggett (1988) proposed that goal orientations influence the probability of adopting a task or an ego goal and situational characteristics can alter these probabilities. The influence of the motivational climate on goal involvement will depend on the strength of the individual’s goal orientations. If perceptions of goal orientations are moderate to weak then perceptions of the motivational climate will override them.

Following the interactionist perspective, many researchers have studied the impact of dispositional and situational goals on various outcomes (e.g., Balaguer, Duda, Atienza, & Mayo, 2002; Fry & Newton, 2003; Gano-Overway et al., 2005; Kavussanu & Roberts, 1996; Kim & Duda, 1998; Liukkonen et al., 1998; Newton & Duda, 1999; Pensgaard & Roberts, 1999; Treasure & Roberts, 1998) without looking at the actual relationship between the two constructs. Other researchers have investigated the relationship between perceptions of the motivational climate and goal orientations adopting correlational or predictive techniques (Ebbeck & Becker, 1994; Gano-Overway & Ewing, 2004; Magyar & Feltz, 2003; Ntoumanis & Biddle, 1998a, 1998b; White et al., 1998). When employing regression analysis, the majority of researchers specified the direction of prediction from perceptions of the motivational climate to goal orientations. The studies examining the impact of athletes' perceptions of the motivational climate on their goal orientations will be presented first, followed by studies examining the relationship between the two constructs in the opposite direction.

Results consonant with the theory were generated by Ebbeck and Becker's study (1994) with 75 male and 91 female adolescent soccer players aged 10 to 14 years. Canonical correlational analysis revealed that perceptions of a strong task-and weak ego-motivational climate could predict players' task orientation but were unrelated to ego orientation. These findings suggested that soccer players were more prone to judge success with self-referenced criteria when perceiving a task-involving motivational climate initiated by their coach, but when it came to define success in normative referenced criteria the goal reward structure that they perceived did not influence their judgments. It was further recommended that different predictor variables should be considered when trying to explain variance in ego orientations. Partial support of these findings was provided by White et al. (1998), where perceptions of a task-involving climate positively predicted task orientations: interestingly, task orientations were also positively predicted by perceptions of an ego-involving climate. Ego orientations were only predicted by perceptions of an ego-climate.

A longitudinal study by Gano-Overway and Ewing (2004) examined dispositional goals three times during a 16-weeks period. Perceptions of motivational climate and practice strategy use were assessed only at the end of the study with a sample of 162 university athletes. One of the findings focused on the impact of motivational climate on practice strategies used by the athletes. It was shown that only task-involving climate predicted strategy use and specifically the subscale of Cooperative Learning. Other findings concerned the motivational climate's influence on goal orientations. Perceptions of a task-involving motivational climate predicted

positively task orientations and ego-involving climate predicted positively ego-orientations at the end of the season after controlling for goal orientations at the beginning of the season. The percentage of variance explained by motivational climates in goal orientations was small compared to the variance explained by the goal orientation at time 1, but still motivational climate positively predicted goal orientations at the end of the semester. Coaches only met with their athletes in a 2.5 hours class every week. Thus the researchers concluded that although motivational climate's impact was small in terms of explained variance in goal orientations, results are encouraging, as coaches can influence athletes' goal orientations in such a small time of interaction with them.

Another study conducted by Williams (1998) following a similar design showed that perceptions of a more task-involving climate positively predicted an increase in task orientation. Williams measured goal orientations three times across a season and perceptions of the motivational climate once at the end of the season. Although early task-orientations predicted 19% of the variance in late task orientations, task-involving motivational climate added an 11% additional variance, and was proved to be a better predictor than task orientations. In the prediction of late ego orientations only early ego orientations were found to explain the variance, and motivational climate did not contribute to the variance explained. Contrary to Gano-Overway and Ewing's (2004) study, perceptions of an ego-involving climate positively predicted an increase in task orientation as well. The slightly different results regarding the effect of ego-involving motivational climate on goal orientations were attributed to the context in which the two studies took place. Gano-Overway and Ewing's (2004) study was conducted within the university context in a learning environment, whereas Williams' (1998) study was conducted with athletes from clubs.

Ntoumanis and Biddle (1998b) took a different approach reversing the influence between motivational climate and goal orientations. They examined the impact of different combinations of goal orientations, that is, the impact of athletes' goal orientation profiles on perceptions of the motivational climate, in 146 British university athletes from team sports. Results showed that the task-oriented athletes irrespective of their high or low ego orientation, and the highly ego-oriented athletes with high task orientation as well, perceived the climate as more task-involving. This finding suggests that a task-involving climate will accommodate athletes with similar views on the nature and means of achievement. Ego-oriented athletes with low levels of task orientation perceived an ego-involving climate.

Magyar and Feltz (2003) examined the role of the motivational climate as a moderator or mediator on the goal orientations' influence on sources of sport confidence. Results revealed that perceptions of the motivational climate failed to act as moderators, but were shown as partial mediators in the relationship between goal orientations and leadership and social support as sources of sport confidence. Non-significant moderating effects of perceptions of the motivational climate on the influence of goal orientations on anxiety were provided by Ntoumanis and Biddle (1998a). They reported that athletes with high task and high ego orientation perceived a more task-involving climate than athletes who perceived low task orientation.

All these studies conducted within the sport realm suggest that perceptions of task-involving climate are related to dispositional goals, confirming Nicholls' (1989) theory that athletes enter their sport with certain dispositions and tendencies in adopting certain achievement goals, and the operating climate in the team has the potency to change these dispositions. Results showed that perceptions of a task-involving climate positively predicted task orientation (Gano-Overway & Ewing, 2004; Williams, 1998). Ego-involving motivational climate perceptions have been shown to positively predict ego-orientations (Gano-Overway & Ewing, 2004), and positively predict change in task orientations (Williams, 1998).

Furthermore, athletes' goal orientations were shown to associate with their perceptions of the motivational climate in their team (Ntoumanis & Biddle, 1998a, 1998b). Athletes characterised by high task orientation irrespective of the levels of their ego orientation were more likely to perceive task-involving climates. Ego-involved athletes were more likely to perceive ego-involving climates. These results were in line with the suggestion that although ego-orientation on its own produces maladaptive outcomes, in conjunction with high task orientation is not motivationally detrimental (Fox, Goudas, Biddle, Duda, & Armstrong, 1994; Ntoumanis & Biddle, 1998a, 1998b; Roberts, Treasure, & Kavussanu, 1996).

Summarising motivational climate perceptions have been reported to predict goal orientations and act as mediators in the relationship of goal orientations with outcome variables. Goal orientations have been shown to also predict motivational climate perceptions. Both hypotheses on the direction of the prediction seem to hold true, lending support to the fact that both dispositional and situational goal perspective are related and mutually influence each other to produce the final goal adoption and goal involvement. Further research on the role of motivational climate and goal orientations on the goal involvement is necessary to unravel these complex interactions among the achievement variables.

Motivational Climate, Athletes' Affective, and Behavioural responses.

Perceptions of the motivational climate have been proposed to influence athletes' patterns of affective and behavioural responses. Task-involving perceptions of the climate have been assumed to yield adaptive emotions and behaviours, while ego-involving perceptions of the climate have been suggested to give rise to maladaptive emotions and behaviours. On this basis, researchers have tested the hypotheses that task climate will predict more positive affect, such as satisfaction and enjoyment, less negative affect, such as anxiety and boredom, and higher levels of well-being in terms of self-esteem, self-worth, and subjective vitality. Task-involving climate perceptions were also hypothesised to predict adaptive behaviours, such as effort, and less maladaptive behaviours such as physical exhaustion, physical symptoms, burnout, drop out/ withdrawal, self-handicapping, and aggressive behaviours. The opposite pattern was hypothesised for perceptions of an ego-involving climate. Studies examining the hypothesised relationships and their results are presented next.

Enjoyment as an affective outcome of goal orientations and perceptions of motivational climate was assessed with 557 male Finish 14 year old soccer players (Liukkonen, 1998; Liukkonen, Telama, & Biddle, 1998). Different groups of participants were formulated according to their level of competence, their goal orientations, and their perceptions of the motivational climate. Analysis revealed that the players who were task oriented, perceived high levels of competence and played in a task-involving motivational climate experienced high levels of enjoyment. On the contrary, ego oriented players with low perceived competence operating in a highly competitive environment experienced low levels of enjoyment. Enjoyment was high in both high and low ego-oriented players with high or low perceived competence operating in a task-involving climate. On the other hand enjoyment was low in both high and low ego-oriented players with low levels of perceived competence playing in an ego-involving climate.

Competitive anxiety in relation to goal orientations and motivational climate was examined in 146 male and female university athletes (Ntoumanis & Biddle, 1998a). Structural equation modelling results showed no direct influence of the motivational climate on the anxiety responses. Indirect influences were observed only in the case of ego-involving motivational climate on ego orientation, which in turn through self-confidence impacted on competitive anxiety. In Ntoumanis' (2002) study of motivational profiles, less boredom, high levels of enjoyment and effort were reported by athletes who perceived high task-involving climate levels. Low levels of effort and enjoyment, and high levels of boredom were reported by athletes who reported high levels of ego-involving motivational climate.

Reinboth and Duda (2004) examined perceptions of motivational climate and ability in relation to indices of psychological and physical well-being in a sample of 265 British adolescent male soccer and cricket players. Well-being was measured in terms of self-esteem, contingent self-worth, emotional and physical exhaustion and physical symptoms. Perceptions of a task-involving motivational climate positively predicted global self-esteem and contingent self-worth. Low perceived ability athletes perceiving high ego-involving climate reported lower self-esteem. Athletes perceiving a task-involving motivational climate, regardless of their levels of perceived ability, reported higher self-esteem. Furthermore, perceptions of an ego-involving climate were positively linked to the emotional/physical exhaustion facet of burnout and reported physical symptoms. Perceptions of a task-involving climate emerged as negative predictors of physical symptoms.

In extension of the previous study Reinboth, Duda, and Ntoumanis (2004) examined several dimensions of coaching behaviour on satisfaction of psychological needs and indices of psychological and physical well-being in 265 British adolescent male soccer and cricket players. Coach autonomy support, effort/improvement reflecting a task-involving climate, and social support were assessed as different facets of the environment created by the coach. Furthermore, based on self-determination theory Reinboth et al. assessed autonomy, competence and relatedness as the basic psychological needs that should be satisfied in order for the athletes to experience well-being and positive outcomes. Well-being was assessed in terms of subjective vitality, intrinsic satisfaction with and interest in sport, and physical symptoms. Structural equation modelling analysis revealed that moderate to strong paths related the three dimensions of the social environment created by the coach to the psychological needs of autonomy, competence and relatedness. Moreover, the need for autonomy positively although weakly predicted subjective vitality and intrinsic satisfaction/interest in sport, but did not predict physical symptoms. The need for competence positively predicted subjective vitality and intrinsic satisfaction/ interest in sport and negatively predicted physical symptoms, being the best predictor of all the outcomes measured. Perceptions of relatedness failed to predict any of the mental/physical welfare among team sport participants. Generally, this study provided evidence on the impact of the social environment created by the coach on the athletes' satisfaction of the basic psychological needs and in turn on how this social environment fosters well-being.

The impact of motivational climate on behavioural outcomes such as the tendency for burnout has been examined in elite male and female basketball players in Taiwan (Chi, & Chen, 2003).

It was shown that, among male basketball players, perceptions of task-involving climate were negatively related to all subscales and the composite score of burnout, whereas perceptions of ego-involving climate were positively associated to perceptions of athletic performance, psychological withdrawal, devaluation by the coach and the team mates and the composite score of burnout. For the female players only, perceptions of an ego-involving climate were positively correlated with devaluation by the coach and the teammates. Further evidence on the link between perceptions of the motivational climate and participation/withdrawal was given by a study conducted with 217 young and 74 former judokas (Gernigon & Le Bars, 2000). Athletes who had dropped out appeared as more ego-involved and identified the motivational climate as less task-involving than the athletes who participated.

Guillet and Sarrazin (2000) examined the relationship of perceptions of the motivational climate and intentions of dropping out in a sample of 600 French female handball players. Results showed that task-involving motivational climate positively predicted perceived progress. Perceptions of an ego-involving motivational climate negatively predicted perceived autonomy. Perceived progress and perceived autonomy positively predicted self-determined motivation. Higher levels of self-determined motivation corresponded to lower intentions of dropping out. Lower levels of self-determined motivation corresponded to stronger intentions of dropping out.

Whitehead, Andrée, and Lee (2004) employing 114 of the athletes who participated in the first study identified persisters from non-persisters in sport. Results showed that athletes who perceived an ego-involving climate in their team and had low perceived ability or athletes who perceived an ego-involving climate and were task-oriented were most likely to withdraw. Interestingly, although perceptions of the motivational climate were low in this study, Dweck and Leggett's (1988) proposition was supported in that strong situational cues may override weak achievement goals. Athletes with self-referenced criteria and low perceptions of ability perceiving a comparative climate that required them to show superiority over the others perceived they could not do so due to their low ability.

Ryska, Yin, and Boyd (1999) examined the relationship among situational and dispositional goals and perceived soccer competence on trait and situational self-handicapping in a sample of 206 male and female soccer players aged 10 to 17 years. Canonical correlation analysis results showed that perceptions of a task-involving followed by ego-involving climate were the better predictors of self-handicapping behaviour exhibited by the young players before the competition compared to goal orientations and perceptions of competence. In particular, low

task-oriented athletes who perceived a low task- and high ego-involving climate were more likely to engage in self-handicapping behaviours. Results were partially replicated in Kuczka & Treasure's (2005) study with 140 golfers. Perceptions of task-involving climate predicted situational claimed self-handicaps, while perceptions of an ego-involving climate did not contribute to the prediction. The low percentage of participants reporting high scores of self-handicapping might have influenced the ego-involving climate's impact on self-handicapping.

A very recent study examined the relationship between athletes' perceptions of the motivational climate and aggressive behaviours displayed by 162 male handball players aged 13-15 years (Rasclé, Coulomb-Cabagno, & Delsarte, 2005). Results showed that perceptions of a task-involving motivational climate were not related to aggressive behaviours. On the contrary, perceptions of an ego-involving motivational climate predicted instrumental aggression (i.e., more performance oriented aggression, including no emotions) in athletes participating in lower competitive levels and hostile aggression (i.e., emotional response usually driven by frustration or anger, aiming at causing pain or suffering of the victim and constituting an end in itself) in athletes participating in lower competitive levels. The former result was expected. Athletes competing in high levels and sports with a more professional organisational structure are expected to show more instrumental aggression, as illegitimate behaviour could be perceived as part of the game (Allison, 1982, cited in Rasclé et al., 2005). The latter result was unexpected and could be a result of the specific sample (only male players, from a specific sport, in a pre-adolescence to adolescence period) or could be attributed to culture influences.

With regards to the impact of the motivational climate on affective outcomes, all previous findings suggest that it is vital and decisive to the experience of enjoyment (Liukkonen, 1998; Liukkonen, et al., 1998), anxiety (Ntoumanis & Biddle, 1998a), boredom and effort (Ntoumanis, 2002), and well-being (Reinboth & Duda, 2004; Reinboth et al., 2004). With regards to the impact of the motivational climate on behavioural outcomes, all previous findings suggest that it affects practice strategy use (Gano-Overway & Ewing, 2004), physical symptoms (Reinboth & Duda, 2004; Reinboth et al., 2004), burnout (Chi & Chen, 2003; Guillet & Sarrazin, 1999) participation/withdrawal (Gernigon & Le Bars, 2000), self-handicapping (Ryska et al., 1999), and aggression (Rasclé et al., 2005). These results corroborate Nicholls and Ames' suppositions about the adaptive outcomes of the task-involving climate and the maladaptive outcomes of the ego-involving climate. Although, the association between task-involving climate perceptions and positive affect and adaptive

behaviours seem to be consistent, the association between ego-involving climate perceptions and affective and behavioural outcomes appears to be inconsistent and remains to be established. Nevertheless, Reinboth and Duda (2004) argued that perceptions of an ego-involving climate may constitute an antecedent of burnout/drop-out/withdrawal because it might prevent feelings of success and turn athletes' focus to the inadequacy or limitations of their ability. A very interesting issue that emerged from their study centred on the importance of the association between ego-involving climate and physical symptoms. Since the structure of sports is organised around ego-involving environments that promote "winning at all costs" attitudes and philosophies, players are encouraged to make sacrifices and risk their personal well-being thus hurting their health. In addition, Ryska et al. explained that in the social evaluative context of sport, when the athletes perceive that their self-worth as athletes is defined by how the coaches value and assess their competitive performance, they are more likely to engage in self-handicapping behaviours in order to minimise the contribution of low ability as a reason for competitive failure.

A long exposure to these types of climates might have opposite results for the common belief of the educational and life-skills development nature of sports. A widely endorsed common belief lies in the potency of sport and exercise to enhance quality of life (Bloodworth, 2005) and contribute to moral education (Brodie, 2005). Danish, Petitpas, and Hale (1990) commented that "almost every coach, athlete, and sport psychologist believes that participation in sports can have a beneficial effect on the psychosocial development of children and adolescents" (p. 172). However results are encouraging and have pedagogic implications as the motivational climate is more easily subjected to change than goal orientations and perceived competence, which are assumed to be more stable. By creating the right climate, coaches can help instil the belief in athletes that sport is "[not necessarily] a place where one continues to have to prove oneself, it can be a place where one begins to know oneself. When knowing becomes as important as proving, sport becomes an essential vehicle for developing personal competence" (Danish, 1983, p. 237).

Motivational climate and coaching behaviours

In a recent review of the achievement goal theory, Duda (2001) suggested that coach's behaviour is considered to be an important correlate of the motivational climate. There is only one study so far that has recorded the actual coach behaviour and analysed it according to its motivational features. Chaumeton and Duda (1988) using Smoll and Smith's (1989) model and an adapted version of the CBAS recorded coaches' behaviours during two practices and two Olympiads 2006

competitive games of boys' basketball involving 4 elementary school teams, 4 junior high teams and 4 senior high school teams. Coaches' behaviours were categorised and analysed in terms of the task and ego-involving features. Thus, coaches' reinforcement and punishment directed towards the performance process were categorised as task-involving behaviours, whereas reinforcement and punitive behaviours directed towards the performance outcome were categorised as ego-involving behaviours. The coaches of junior high and senior high school players showed ego-involving behaviours more frequently than coaches of elementary players. They also emphasised the players' outcome actions relative to the performance process relatively more in competitions than in practices.

Amorose and Horn (1997) examined the association between perceptions of the motivational climate and perceived coaching behaviours with a sample of 410 male and female athletes from various sports. Analysis showed that athletes who perceived a high task- and low ego-involving motivational climate perceived that their coach exhibited more training and instruction, social support, more positive, encouraging and informational feedback, less punishing feedback, and more democratic behaviours.

More information on the associations between motivational climate, goal orientations, leadership and other outcomes was provided through a series of studies conducted by Balaguer and colleagues (Balaguer, Duda, Atienza, & Mayo, 2002; Balaguer, Duda, & Crespo, 1999; Balaguer, Duda, & Mayo, 1997) with Spanish female handball players and female and male tennis players. In a more recent study, Balaguer, Duda, Atienza and Mayo (2002) investigated 181 Spanish elite female handball players and found that motivational climate was positively related to perceived improvement in individual and team performance (various aspects of the game: e.g., technical, tactical, psychological), as well as with the players' overall satisfaction and positive coach ratings. The more task-involving the climate was perceived to be, the greater was the perceived performance progress and satisfaction and the closer they rated their current coach to their 'ideal' coach. These findings are consistent with previous (Balaguer, Duda, & Crespo, 1999) findings with a Spanish sample of 219 male and female tennis players, except that perceptions of a task-involving climate were related more to the psychological dimension of perceived improvement. An unexpected result of Balaguer et al. (2002) study was that ego-involving climate was positively correlated with players' reported satisfaction with the team's competitive results. They argued that this result could be explained in terms of the inherent ego-involving atmosphere of elite sport. Balaguer, Duda, and Crespo, (1999) examining perceptions of the motivational climate in a sample of 219 tennis players, showed

that the more the athletes perceived a task climate and the more they were task-oriented, the more training and instruction behaviours they perceived provided by the coach. The more the athletes were ego oriented and the more they perceived the climate as task-involving, the more they perceived that their coach was providing social support.

A different approach was adopted by Smith, Fry, Ethington, and Li (2005) who studied the impact of coaching behaviours on the athletes' perceptions of the motivational climate in a sample of 143 female basketball players. In their study, coaching behaviours were seen as antecedents of the motivational climate, contrasting Balaguer and associates' (Balaguer, Duda, Atienza, & Mayo, 2002; Balaguer, Duda, & Crespo, 1999; Balaguer, Duda, & Mayo, 1997) propositions for the reverse influence between the two constructs. What is interesting and differentiates this study from the previous studies that have looked into this association is the direction of causality that is implied in the relationship. The coaching behaviours are considered antecedents of the motivational climate. Their results were consistent with achievement goal theory tenets. Positive feedback provided by the coach positively predicted task-involving climate and negatively predicted ego-involving climate. Punishment-oriented feedback and ignoring mistakes negatively predicted task-involving climate and positively predicted ego-involving climate. Although Smith et al. proposed to measure coaching behaviours only one aspect was actually measured: feedback from the coach.

Pensgaard and Roberts (2000) evaluated situational and dispositional factors as sources of athletes' distress. Participants were 69 Norwegian elite male and female athletes participating in winter Olympic Games and they completed questionnaires assessing perceptions of the motivational climate, goal orientations, sources of distress, total distress and perceived competence. Results indicated that an ego-involving climate was associated with external sources of distress and especially with the coach and the team. On the other hand, a task-involving motivational climate was negatively related to the coach and the team as a source of distress. It was also evident from the analysis that perceptions of the motivational climate were better predictors of cognitive sources of distress, coach and team as sources of distress and total distress than goal orientations. Interestingly, and contrary to other studies that have found perceived ability to be of interest only in a performance climate, results from Pensgaard and Roberts' study showed that ability played an important role in the prediction of distress when athletes perceived task-involving situational cues. Athletes with low perceived ability, regardless of the type of motivational climate perceptions, perceived the coach to be a source of distress more than athletes with high-perceived ability.

As an extension of the previous study Pensgaard and Roberts (2002) examined perceptions of the motivational climate in relation to the role of the coach in the creation of this climate through in-depth interviews. Overall, results of the study confirmed the significance of the coach in the creation of the climate, in that he/she is supportive and builds confidence. Athletes emphasised that a productive climate is a caring and accepting one.

Summarising, results from the studies examining the association between motivational climates and coaching behaviours confirmed the achievement goal theory propositions. Perceptions of a task-involving climate were associated with more positive coaching behaviours, such as the provision of more training and instruction, social support, more positive, encouraging and informational feedback, less punishing feedback and more democratic behaviours. Coaches in such climates are less likely to be seen as a source of distress. In ego-involving climates the opposite pattern was observed. Once more, it is confirmed that task-involving motivational climate is linked with adaptive responses and ego-involving climate with maladaptive responses.

Findings from the studies described above draw a clear, consistent and steady picture on how the task-involving motivational climate impacts and is influenced by various types of motivation, outcomes and antecedents. The findings for ego-involving motivational climate though are less consistent.

2.1.3 Towards a Synthesis of Motivation with other Areas of Research

Duda (2001) has recommended that greater progress in sport psychology research can be accomplished when different bodies of research and their theoretical tenets are synthesised to produce a more inclusive picture of the athlete's motivated behaviour. Among the bodies of research whose integration Duda suggested would enhance our understanding of the motivational processes are group-related processes, beliefs about moral behaviour, and even physical and mental health related constructs. Although researchers have started to investigate motivational climate in relation to sportpersonship (Gano-Overway et al., 2005; Guivernau & Duda, 1998; Kavussanu et al., 2002; Miller et al., 2004; Ommundsen et al., 2003; Treasure et al., 1998) and other health related constructs such as eating disorders (Aimar & Krane, 2003) and well being (Reinboth & Duda, 2004; Reinboth et al., 2004) the integration of theories and concepts is still at a developing stage.

Another area in sport psychology literature that has been proposed for integration with achievement goal theory is the dynamics involved between the athlete and the coach. As the goal structure is mainly created by the leader of the team, coach's behaviour is considered to be the most important correlate of motivational climate. Duda and Balaguer (1999) have argued that models of leadership, namely the Mediation Model of Leadership (Smoll & Smith, 1989) and the Multidimensional Model of Leadership (Chelladurai, 1980; 1990), "provide limited insight into *why* and *how* divergent leader behaviours have differential effects in terms of athletes' self-perceptions, emotional responses to sport, and behaviour in the athletic domain" (p. 217). Before we go on to explain the integration of the two areas of motivation and leadership, a small introduction to the literature on leadership is necessary.

Coach and athlete dynamics have been studied through a leadership perspective by two frameworks that provided an impetus for research in the athletic domain. The first is the Multidimensional Model of Leadership (Chelladurai, 1990) and the second is the Mediation Model of Leadership (Smith, Smoll, & Curtis, 1979). Both models have been extensively used in the study of dynamics and offered valuable information on coaches' behaviour. These models have serious implications for the effective behaviours that the coaches should exhibit in order to have the best possible impact on athlete's psychosocial and physical development.

Researchers in the sports area (i.e., Chelladurai, 1980; 1990; Smith & Smoll, 1996; Smoll & Smith, 1984) have carried out their studies on the general assumption that the type of leadership behaviour exhibited by the coach will have a significant impact on athletes' performance and/or their psychological or emotional well-being (Horn, 1992). Evidence indicates that young athletes who withdrew from their sport often provided coaches' negative actions as a reason for dropping out and ceasing their participation in sport (Robinson & Carron, 1982).

2.1.3.1 Multidimensional Model of Leadership

Chelladurai (1990) developed a theory of leadership effectiveness that was specific to the sport domain. According to Chelladurai's (1990) multidimensional model of leadership behaviour there are three areas in leadership behaviour: required behaviour, actual behaviour and preferred behaviour. Required behaviour is the one that the coach is expected to exhibit according to the demands of the situation (i.e., the organisational structure of the team). Preferred behaviour is dictated by the preferences of the athletes and their individual characteristics, such as their need for achievement. Actual behaviour is the behaviour exhibited by the coach and depends on his/her personality characteristics, the situational requirements

and athletes' preferences. The degree of congruence among *actual*, *required*, and *preferred* leadership behaviour determines the levels of athletes' performance and satisfaction. Chelladurai hypothesised that athletes' performance and satisfaction will in turn influence the actual leader behaviour. The antecedents of the three states of leader's behaviour are the characteristics of the situation (e.g., parameters of the organisation and its environment, such as the goals of the team, social norms, cultural values) the coach (e.g., personal characteristics of personality, ability) and the athletes/team individual difference variables (e.g., age, gender).

Chelladurai and Saleh (1978, 1980) developed an instrument to measure the three states of coach behaviour, the Leadership Scale for Sports (LSS). It is a 40 item questionnaire consisting of five dimensions: (1) the democratic behaviour dimension and (2) the autocratic behaviour which refer to the coaching decision-making styles employed by the coach, (3) the positive feedback dimension and (4) the social support dimension which pertain to the coach's motivational tendencies, and (5) the training and instruction dimension which measures the coach's instructional behaviour. LSS is available in two versions, one is used to measure the actual coach behaviour as perceived by the athletes and/or the coaches, and the other to measure the behaviour preferred by the athletes.

A plethora of studies have tested various elements of the multidimensional model of coach leadership and the majority of these studies have been conducted with university-level athletes. Individual characteristics of the player, such as age, gender, experience and athletic maturity have been examined in relation to coaching behaviours (e.g., Chelladurai & Carron, 1983; Chelladurai & Saleh, 1978; Terry, 1984; Terry & Howe, 1984). The coach's individual characteristics, including playing experience, age, and prior win/loss record seems to affect perceptions of the coach's leadership behaviours. Situational characteristics, such as culture and type and nature of sport, seem to play an important role in athletes' preferences for coach behaviours as shown by several studies (Chelladurai, 1984; Chelladurai, Imamura, Yamaguchi, Oinuma, & Miyauchi, 1988; Chelladurai, Malloy, Imamura, & Yamaguchi, 1987). Limited research has been conducted on the differences between team and individual sport athletes (Terry, 1984; Terry & Howe, 1984). A variety of studies have examined the outcomes of athletes' preferences and perceptions of coaching behaviours (Garland & Barry, 1988; Horn & Carron, 1985; Riemer & Chelladurai, 1995; Riemer & Toon, 2001; Weiss & Friedrichs, 1986).

2.1.3.2 The Mediational Model of Coach-Player Relationships

There is enough evidence to suggest that the quality of the interaction between coaches and young (especially) athletes will determine the nature of the athlete's experience and the Olympiou 2006

outcomes of participation (Horn, 1985; Smith, Smoll, & Curtis, 1979; Smith, Zane, Smoll, & Coppel, 1983; Smoll, Smith, Curtis, & Hunt, 1978). A major contribution to the study of coach leadership is attributed to the work of Smoll and Smith and their colleagues (Smoll & Smith, 1989; Smoll, Smith, Curtis and Hunt, 1978). Smoll and Smith's (1989) work aimed at the improvement of the quality of player-coach interaction through behaviour modification procedures. They developed a mediational model of coach leadership which consists of three basic elements: coach's behaviours, players' perception and recall, and players' evaluative reactions.

The main tenet of the model is that players' evaluative reactions are not directly affected by the coach behaviours but are mediated by players' cognitive and affective processes, their perception and recall. According to the model, factors affecting these elements are coach's and players' individual difference variables and situational factors. The mediational model provides a foundation for examining *actual* coaching behaviours and athletes' perceptions and evaluations of these behaviours, as well as the factors influencing these components.

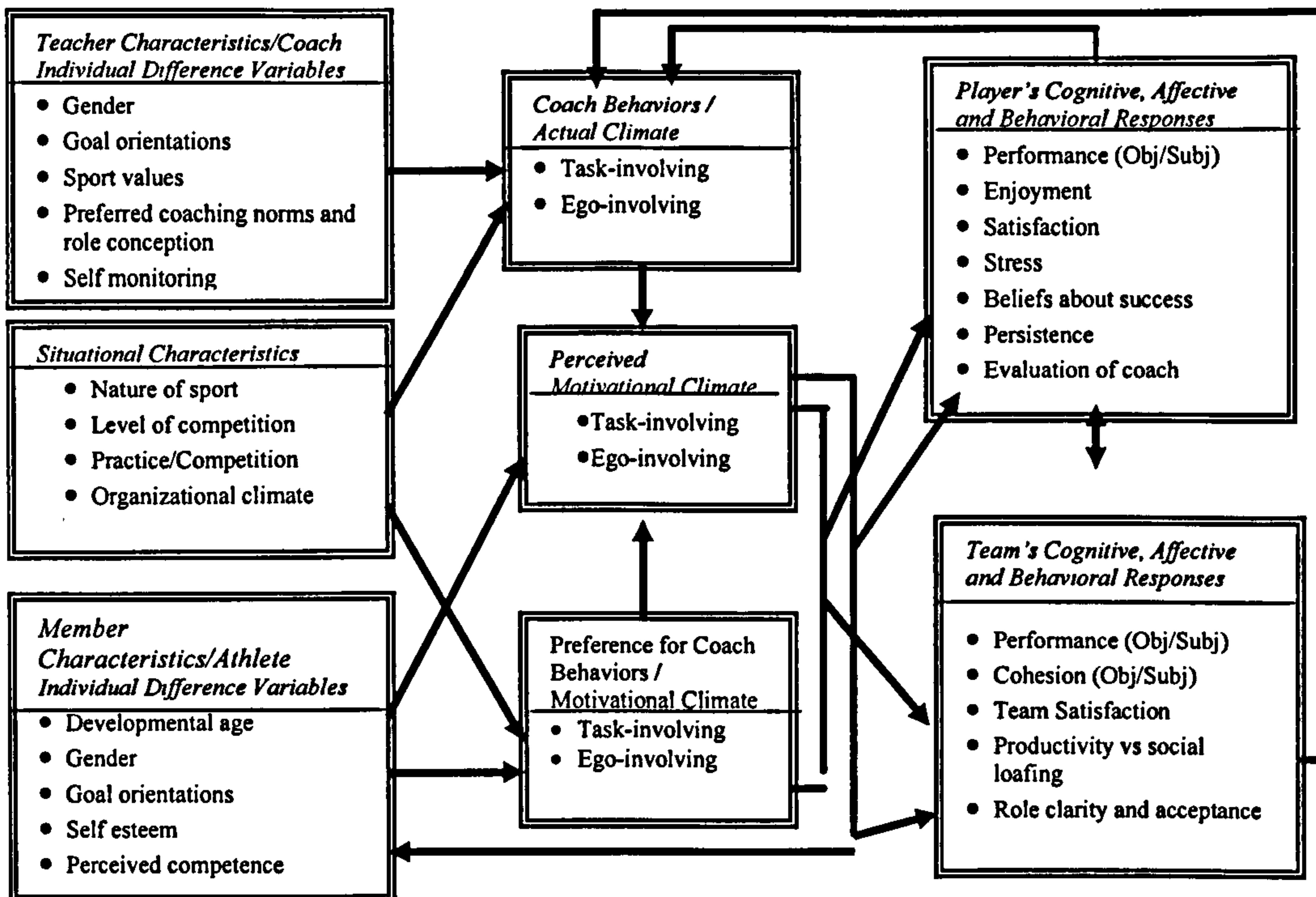
Smith, Smoll, and Hunt (1977) developed the Coaching Behaviour Assessment System (CBAS) which is a method used by trained and qualified observers who recorded and coded the actual behaviour exhibited by coaches in naturalistic settings. The CBAS comprised 12 behavioural dimensions divided in two major categories: reactive and spontaneous behaviours. Reactive behaviours are coach's responses to (a) desirable performance or effort, (b) mistakes and errors, and (c) misbehaviours. Spontaneous behaviours may be (a) game-related or (b) game-irrelevant. Players' perceptions and recall of the coach behaviour, as well as coaches' perception of their own behaviour, were assessed by questionnaires.

Players' individual differences found to affect their perceptions of coach behaviours include age, gender, normative beliefs, achievement related motivation, competitive trait anxiety and general self-worth and self-esteem. Specifically, younger players perceived more punitive coach behaviours, pre-adolescents perceived more positive and encouraging behaviours and adolescents focused on the quality and quantity of technical instruction (Smith, Smoll, & Curtis, 1979). Female players perceived and preferred more reinforcement and encouragement than male players (Smith & Smoll, 1989). Coaching behaviours in terms of coach's feedback were studied in relation to athletes' perceived competence and satisfaction (Allen & Howe, 1998), drop out (Barnett, Smoll, & Smith, 1992), and self-esteem (Smith & Smoll, 1990).

2.1.3.3 Duda and Balaguer's model of leadership and motivation

Duda and Balaguer (1999) proposed a model of leadership and motivation in an attempt to further understand the complex dynamics between the coach and the athlete and its impact on motivational climate. The model (see Figure 1) pulls together concepts from two of the most popular coach leadership models as well as situational and dispositional tenets from achievement goal theory. The development of this model was more of an attempt to pull together tenets from the leadership and achievement goal theory and create a framework to guide researchers in the study of associations between the constructs.

Figure 1: The integrated model of leadership and motivation (Duda & Balaguer, 1999)



Duda and Balaguer assimilated in their model the constructs of motivational climate and goal orientations derived from achievement goal theory, observed coach behaviours drawn from Smith and Smoll's (1989) model, and athletes' preferences for these behaviours (Chelladurai, 1990). The model proposes that coaches' actual behaviours along with athletes' perceptions of and preferences for coach behaviours, influence athletes' perceptions of the motivational climate. The model also postulates that different patterns observed in athletes' dispositional variables, such as goal orientations, coupled with perceptions of the motivational climate have an impact on individual and team cognitive, affective and behavioural responses.

Empirical evidence supports Duda and Balaguer's integrated model. For example, Balaguer and colleagues (Balaguer, Duda, Atienza, & Mayo 2002; Balaguer, Duda, & Crespo, 1999; Balaguer, Duda, & Mayo, 1997) in a series of studies with Spanish athletes showed that motivational climate is related to coach leadership style. Specifically, perceptions of coaches who were more socially supportive and provided more training and instruction were positively related to a perceived motivational climate promoting task-involvement. Therefore, how athletes perceive that their coaches structure the environment, what cues athletes perceive that the coach emphasises, what cues they would like to be emphasised, and the actual objective motivational climate are all assumed to be a function of how the coach behaves and interacts with his/her athletes.

The significance of the coach in the creation of an environment that has adaptive or maladaptive consequences for the athlete is evident from empirical work, including interviews conducted with top-level athletes (Pensgaard & Roberts, 2002), and from anecdotal evidence. Pensgaard and Roberts (2002) quoted an athlete who suggested "...if the coach involves himself in the team and becomes a friend and coach, you can reach so much further—you are so much stronger as an athlete..." (p. 57). The coach can also be seen as a source of distress for the athletes (Gould, Jackson, & Finch, 1993; Scanlan, Stein, & Ravizza, 1991; Smith et al., 2005). This was the case especially when he or she was perceived to reinforce performance outcomes and normative criteria of success (Pensgaard & Roberts, 2000) or when the coach's feedback was punishment-oriented (Smith et al., 2005). A 'winning at all costs' attitude, endorsed by the coach, has been proposed to contribute to inadequate and ineffective relationships between the coach and the athlete (Jowett & Cockerill, 2002).

In conclusion, evidence suggests that the coach, his/her behaviours, and the way he/she interacts with his players are the main contributors to the structure of the climate in a team. However, interaction between a coach and an athlete is not a unidirectional process, but it involves both persons. As a social interaction, it refers to a reciprocal relationship between two individuals whose behaviours are mutually dependent (Carron, 1980; Hollander, 1971; Jowett & Cockerill, 2002; Kelley et al., 1983). It is likely, nonetheless, that the motivational climate is associated with both the quality of the relationship that is developed between athletes and their coaches, as well as the unidirectional interaction that is taking place in terms of behaviours exhibited by the coach towards the athlete.

Although Balaguer and associates' studies provided an initial testing of some of the basic proposed relationships drawn from the integrated model of leadership and motivation, there is

an explicit need for further investigation of the model. Subsequent work might centre on the potential interdependencies between achievement goal and leadership constructs, and other antecedent and outcome variables. In addition, extension of the model by incorporating constructs assessing the bi-directional coach-athlete relationship might capture a complementary angle on the study of motivation and coach-athlete dynamics.

In the following section, a recent conceptualisation of the coach-athlete relationship will be presented along with empirical work examining its validity. A case will be built and arguments presented for the incorporation of this conceptualisation within Duda and Balaguer's (1999) model.

2.2 The Coach-Athlete Relationship

2.2.1 Introduction

The sports arena has been characterised as a forum where many relationships are formed and dissolved. People do not engage in sports by themselves. On the contrary, “they engage in sports in the presence of other people, with other people, against other people, and sometimes just for other people” (Scanlan & Lewthwaite, 1986, p.41). Relationships and interactions are created between athletes and their peers, their opponents, their coaches, their parents, officials, spectators, referees/judges, sport psychologists. Among the most involved in the athletes’ sporting life, and the most influential people for the athletes’ performance and success, are their coaches.

Coaches play an extremely important role in the development of the athlete because through their mutual trust and respect, they build a relationship with each other which serves as a vehicle towards the fulfilment of their dreams, needs, and goals (Jowett & Cockerill, 2002). Furthermore, the coach is the main person who takes on different roles in the interaction and relationship with the athletes. Some of the roles include the coach as an educator, teacher, mentor (Bloom, Durand-Bush, Schinke, & Salmela, 1998; Miller, Salmela, & Kerr, 2002), friend, motivator (Vallerand & Losier, 1999), provider of social support (Chelladurai, 1990), a source of competence (Magyar & Feltz, 2003) and distress (Pensgaard & Roberts, 2000) for the athlete. The coach holds the potential to influence youth participation and the whole sporting experience through his/her behaviours, attitudes, values, goals, expectations, and most of all his/her interpersonal behaviours (Smith & Smoll, 1996). Losier and Vallerand (1995) indicated that the more athletes perceive their relationship with a coach in a positive light, the more intrinsically motivated they are towards their sport. The influence of the coach might even supersede the domain of sport and the enhancement of athletic skills and extend to other domains of the athlete’s life, taking the role of a father figure (Hemery, 1986) and in extreme cases the form of a substitute parent to athletes from single-parent families (Smith & Smoll, 1996).

The relationship between the coach and the athlete lies at the heart of the coaching process (Jowett & Cockerill, 2002). The coach-athlete relationship is critical not only for the athlete’s competitive performance and acquisition of athletic skills, but for his/her general well-being and psychosocial development. Both coaches and athletes invest time, money, and energy to

help athletes develop their potential as persons and to reach optimal functioning. Athletes and coaches create relationships that will affect their well-being. Jowett (2005) explained the importance of studying the coach-athlete relationship in terms of the help that the athletic relationship can provide at times of injury, emotional crisis and at transitional periods. Anecdotal evidence supports this contention. A recurrent theme in many interviews with top-level athletes and coaches is that placed on the importance of the athlete's relationship with his/her coach in achieving success in sports. Patrick Johnson referred to the relationship with his coach as a "two-way street". At the same time, coaches talk about the importance of a good coach-athlete relationship for the on-field team's performance. Brian Canavan, the Sydney Roosters' football manager, states that:

"While a workable relationship is paramount, the player and coach have never had to be the closest of buddies... a harmonious player-coach relationship is also developed by including players in club issues beyond football. ... Nowadays, the player-coach dynamic is an essential working partnership, relying heavily on consistent open communication exchange. A difference in personality is for the most part irrelevant, as long as the player-coach alliance is punctuated by mutual respect." (Haynes, 2001, p. 7).

However, the importance of the relationship between the coach and the athlete becomes even more evident when considering the negative side of it. Coach-athlete relationships characterised by lack of trust, respect and support, and an imbalance of coach's authority, power and responsibilities often results in dissolution, athlete's and coach's burnout, withdrawal, and various forms of manipulation (Cockerill, 1997): examples of sexual harassment and abuse have made headlines in the last decade (Burke, 2001).

Despite the importance of the coach-athlete relationship, it has received little attention from sport psychology researchers and has been characterised as an "unchartered territory" (Wylleman, 2000). Little is known about how the coach-athlete relationship influences various outcomes, the mediators and its developmental course. For example, while little evidence exists on how the coach-athlete relationship influences cognitions such as team cohesion (Jowett & Chaundy, 2004), and satisfaction (Jowett, 2001; Jowett & Ntoumanis, 2004), there is no evidence on its impact on motivation, attitudes, beliefs, and performance. Moreover, the mechanisms by which the coach-athlete relationship impacts cognitive, affective and behavioural outcomes have yet to be explored. In the last 5 years considerable efforts have been made by researchers adopting different angles to the study of the coach-athlete relationship. Qualitative attempts to dissect the quality and the main components of this athletic relationship have been led by various scholars, with some efforts being one-off attempts

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(Poczwardowski, Barrot, & Henschen, 2002; Poczwardowski, Barott, & Peregoy, 2002; Seiler, Kevesligeti, & Valley, 1999; Stambulova, 1999) and others leading to a series of studies (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000) and the building of a conceptualisation (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004). This chapter reviews existing approaches to the study of the coach-athlete relationship and their limitations, introducing a recent conceptualisation of this relationship.

2.2.2 Theoretical Frameworks and Systematic Investigations of the Coach-Athlete Relationship

Various studies have looked at different components, aspects and meanings of the coach-athlete relationship from diverse perspectives. Serpa (1999) classified the different lines of investigation undertaken by sport psychology researchers in the following categories based on the focus of their research: (1) socio-emotional, focusing on the emotional component that results from the coach-athlete interaction (Chappuis & Thomas, 1988; Kaliopuska, 1993; Levèque, 1992), (2) organisational approach, focusing on the leader's behaviour, individual (the coach's and athletes') as well as the situational characteristics and emotional and behavioural outcomes (Chelladurai, 1990), and (3) behavioural approach, focusing on the impact of coach's behaviour on the athletes' attitudes and behaviours (Smith & Smoll, 1989). Although the origins of the behavioural and organisational approaches can be traced back to the USA and Canada, and a great deal of the research endorsing these approaches has been conducted there, the socio-emotional approach (including psychoanalytic and personality approaches) has gained more popularity in Europe (Serpa, 1999).

Poczwardowski and colleagues (1997; Poczwardowski, Barott, & Henschen, 2002; Poczwardowski, Barott, & Peregoy, 2002) attempted a slightly different classification, based on the basic psychosocial processes addressed by each researcher or team of researchers, including: (1) the psychoanalytic and personality approaches that focus on the coach and the athlete's personality traits and use psychoanalytic concepts to explain the interaction between the athlete and the coach (Hendry, 1969; Kalliopuska, 1993; Moore, 1970; Ogilvie, 1993, 1994, 1995; Ogilvie & Tutko, 1966; Tutko & Richards, 1971), (2) the behavioural approach that focuses on the coach's verbal and non-verbal behaviours and its impact on athlete's cognition and behaviour (Rushall, 1977, 1989; Smith, Smoll, & Curtis, 1979), (3) the cognitive approach, focusing on the coach's and athletes' perceptions of each other (Danielson, Zelhart, & Drake, 1975; Massimo, 1980), (4) the social-psychological approach focusing on the social roles and

supporting networks that affected coach-athlete interaction and the athlete's performance (Coakley, 1990; Hellstedt, 1987; Liukkonen, Salminen, & Telama, 1993; Ping, 1993), and (5) the interactionist approach that focuses on the impact of the individual and the situational characteristics on different aspects of coaching behaviour, incorporating emotional and cognitive elements (Carron & Bennett, 1977; Carron & Chelladurai, 1978; Chelladurai & Saleh, 1978).

It is apparent from both classification attempts that they share common characteristics. The psychoanalytic approach forms a distinct category emphasising the emotional component in the coach and athlete interaction. The behavioural approach encompasses Smith and Smoll's mediational model of leadership. Finally, Chelladurai's multidimensional model of leadership is classified either under the organisational or the interactionist approach. One issue arising in the classification of the two leadership models as coach-athlete relationship models is the equation of concept of leadership to the concept of the coach-athlete relationship. Chelladurai's and Smith and Smoll's models are shown to explore the coach-athlete relationship phenomenon. Although, these two models have provided sport psychology with valuable information on the coach and athlete interaction with regards to perceived and preferred and actual behaviour, they can by no means be assumed to assess the relationship formed between the coach and the athlete. Their focal point is mainly on the coach's behaviour and its antecedents and consequences. For example in Chelladurai's model, athlete's satisfaction and performance are assumed to be a function of actual, preferred, and perceived coaching behaviour. Athletes' cognitive, affective, and behavioural patterns are not considered and measured. In Smith and Smoll's model the coach's behaviour is assumed to impact on athletes' evaluative reactions via athletes' perceptions and recall. For example, although the CBAS provides a measure of the actual coach behaviour, players' behaviours are *not* recorded and/or analysed.

However, as mentioned earlier, a relationship as a social phenomenon is generated by mutual interactions, as it involves more than one person. On those grounds, the study of the coach-athlete relationship necessitates the simultaneous study of both actors' behaviours and the impact on each other's emotional, psychological patterns. Wylleman (2000) underlined the importance of translating the coach-athlete relationship in terms of its bi-directional nature and strongly criticises the leadership approach for neglecting the athlete's contribution to the development and the maintenance of the relationship. Furthermore, Jowett (2005) has explained that these two leadership frameworks view the coach-athlete dynamics from a

unidirectional point of view, that is, they view coaches' behaviours as communicative acts. She argued that coaching behaviours are seen as a characteristic of the coach, originating from the coach, and focusing only on what a coach does to the athlete. A study of the coach-athlete relationship though necessitates the simultaneous study of both actors' behaviours and the impact on each other's emotional, psychological patterns. Jowett (2001, 2002) explains that relating refers to a person, whereas a relationship refers to two individuals and is the combination of their interrelating. Thus, from that point of view, the leadership models are restricted to the study of "relating".

A second major limitation of the leadership approach to the study of the coach-athlete relationship centres on its behavioural nature. Coaching behaviours are recorded and analysed, athletes' perceptions of coaches' behaviours are provided and athletes' satisfaction and performance are reported. A major criticism of the CBAS is that it lacks cognitive assessment in that cognitive and emotional responses are not recorded, neither for the coach nor for the athlete (Abraham & Collins, 1998). Serpa (1999) suggested that interpersonal perceptions and especially how athletes view their coaches' perceptions of their experiences can make a significant contribution to the harmony of attitudes and thinking and to the success of the dyad. Interpersonal relationships involve interpersonal feelings, thoughts and behaviours (Jowett, 2001). The examination of both coaches' and athletes' emotions, thoughts and behaviours are required to infer the quality of the coach-athlete relationship (Jowett, 2005).

Another issue inherent in the study of the coach-athlete relationship from the socio-emotional approach is that the studies reported to have investigated the coach-athlete relationship are fragmented. Whilst, Chelladurai, and Smith and Smoll with their two leadership models created respectable traditions in the study of coach's behaviour which were followed by numerous studies, other approaches to the study of coach-athlete relationship have not been so successful. Results for example from Kalliopuska (1993) or Massimo (1980) have not been used for the development of a theoretical model of the coach-athlete relationship. More recent attempts in the study of the coach-athlete relationship adopting the psychodynamics and personality approach include the study by Huguet and Labridy (2004) who investigated the impact of the family structure through the transference process on the coach-athlete relationship. Results from clinical unstructured interviews with six elite athletes revealed that within the coach-athlete relationship athletes tended to replace what they lacked in previous parental relationships in terms of communication with their parents or the actual presence of a parent with their coach. Furthermore, Ogilvie, Tofler, Conroy, and Drell (1998) warned about

the violation of the boundaries in the coach-athlete relationship by sexual abuse from one of the parties in the relationship. Utilising the processes of transference and counter-transference they analyse five clinical cases of relationship disturbances. These studies are very promising, but since their results were restricted to interviews with limited participants, they have not been confirmed in large samples and are therefore not generalisable.

In addition to these classifications, the coach-athlete relationship has been studied from sociological, philosophical, and pedagogic approaches. Embedded in the socio-psychological approach, the qualitative attempt by Seiler, Kevesligeti, and Valley (1999) studied the interactions between 15 female athletes and their coaches through semi-structured interviews. Results showed that the roles (i.e., social, professional and sex-role) that were adopted by the coaches influenced the coach-athlete relationship. Differences in the fundamental principles of the coach-athlete interaction, as perceived by both sides, resulted in incompatibility. Based on these findings Seiler et al. (1999) emphasise the importance of the agreement in the purposes and goals of the interaction between the coach and the athlete for a long-lasting and fruitful co-operation.

Driven away from the technical and instructive component that focuses on training and performance issues, such as reinforcement, decision making styles, technical and corrective instruction, researchers have concentrated their efforts on analysing personal dimensions such as mentoring (Bloom, Durand-Bush, Schinke, & Salmela, 1998), theorising and providing philosophical justification on another personal side, that of friendship (Drewe, 2002). Specifically, Drewe argued from a philosophical point of view that deep friendships between the coach and the athlete should be avoided and “utility friendships” should be encouraged instead. She suggested that inherent in the term “friendship” is the concept of equality, namely, that neither of the two parties are under the authority of the other, however in the context of the coach-athlete relationship this requirement cannot be satisfied.

Yet, the pedagogic element in the context of the coach-athlete relationship has been studied through the concept of “entailing” on the part of table tennis players towards their coach (Lima, 1994). Entailing refers to the subordinate condition and an imposed obligation. The importance of breaking the pedagogic entailing, namely when the coach teaches and the table tennis player learns, is important for the development of the athlete’s autonomy and independence in the construction of his own player identity. Lima (1994) suggests that entailing can be substituted with cooperation, leading to a more effective coach-athlete relationship and a healthier self-development.

Attempts to explore the relationship between the coach and the athlete from different perspectives such as philosophical, sociological, pedagogical and even socio-emotional and psychoanalytical, add to and expand our knowledge on the subject, yet their findings await further validation and linking with a theoretical framework. These approaches do not examine the study of the coach-athlete relationship in a systematic and structured way (Wylleman, 2000). The athletic relationship between the coach and the athlete should be viewed as a holistic phenomenon and should not be studied fragmented into small parts (Jowett 2005; Jowett & Poczwardowski, in press; Poczwardowski, Barott, & Henschen, 2002; Poczwardowski, Barott, & Peregoy, 2002). The lack of a solid coach-athlete relationship conceptualisation and a clear methodology constitute potential reasons for the insufficient delineation of this topic.

Taken together, these shortcomings suggest that the predictive and explanatory power of these theories and models are limited and the area of coach-athlete relationship could be enhanced by a theory and a model that considers the possible inclusion of the investigation of the coach and the athlete as a dyad and also attempts to explain different relationship elements. More contemporary and more systematic approaches to study the coach-athlete relationship have been initiated the last 5 years (Jowett, 2001, 2002, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000; Poczwardowski, Barott, & Henschen, 2002; Poczwardowski, Barott, & Peregoy, 2002; Wylleman, 2000). These studies represent efficient and methodological efforts, driven by the past research deficiencies to accommodate both the coach and the athlete in their investigations. Two contemporary approaches will be presented, followed by an extensive description of Jowett and colleagues' (2001, 2002, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a) conceptualisation of the coach-athlete relationship, which is the centre of the attention in this thesis.

2.2.3 Contemporary Approaches to the Study of the Coach-Athlete Relationship

Wylleman's relationship model. In an attempt to overcome the limitations of the leadership approach and to fill the gap in knowledge within the sport psychology domain, Wylleman (2000) developed a conceptual framework and methodology to study the interconnections between the coach, the athlete and the parent, including three components: a) the acceptance rejection component which refers to the adoption of a positive or negative attitude toward the relationship, b) the dominance-submission component that refers to taking a strong or weak

position in the relationship, and c) the social-emotional component reflecting the adoption of the social or personal roles by the members of the relationship. One of the model's great strengths lies in the use of the concept of complementarity and its translation to an operational definition. According to the three components that characterise the athletic relationship, complementarity is construed by the reciprocal responses to the other person's behaviours drawing a dominance-submission picture (e.g., when the coach shows dominance the athlete responds with submission) and an acceptance-submission picture which leads to the satisfaction of the people involved in it.

In order to measure the coach-athlete-parent relationship, the Sport Interpersonal Relationship Questionnaire was developed (SIRQ; Wylleman, 1995). Three relationship assessments comprise the three aspects of SIRQ: a) the assessment of the relationship between the athlete and the coach (SIRQ-AC); b) the assessment of the relationship between the athlete and his/her parents (SIRQ-AP); and c) the assessment of the relationship between the parents and the coach (SIRQ-PC). Each of the three aspects of SIRQ consists of 80 items; 40 items for each member of the relationship. Acceptable psychometric properties have been reported for the SIRQ via exploratory factor analysis, correlations with other existing scales, and test-retest correlations (Wylleman, Vanden Auweele, De Knop, Sloore, & Martelaer, 1995). The SIRQ has been used in a study with 265 talented Flemish athletes to assess the nature of their relationships with their coaches and their parents (Wylleman, De Knop, Vanden Auweele, Ewing, & Sloore, 1994). Results showed that athletes perceived the relations with their coaches, parents and the relationship between their parents and coaches to be constructive, positive, and supportive, and the conflict levels were low.

Wylleman's (1995, 2000) conceptualisation and methodology of the coach-athlete relationship adds important extensions to the previous literature by attempting to address athletes' perceptions of the athletic relationship in a structured and systematic way and by incorporating perceptions of the parent in the coach-athlete relationship, thus formulating an athletic triangle. However certain limitations should be noted. Although, the model purports to address bi-directional perceptions, only the athletes' perceptions are taken into consideration. Coaches' and parents' perceptions of the athletic relationship are ignored. While, recommendations are made for future research on the outcomes of the coach-athlete-parent relationship, individual differences and the environmental aspects are not considered and their implications on the relationship are not discussed in the model. Methodologically, the SIRQ has not been subjected to confirmatory analytic techniques and more rigorous statistical scrutiny.

Poczwardowski and colleagues' framework. Poczwardowski and colleagues (1997; Poczwardowski, Barott, & Henschen, 2002; Poczwardowski, Barott, & Peregoy, 2002) proposed a methodological framework of the coach-athlete relationship based on qualitative research. Six elite female athletes participating in gymnastics, their three coaches and the team's athletic trainer were interviewed. Thick analysis was used as a strategy to analyse the in-depth interviews (Coffey & Atkinson, 1996). A combination of research traditions was used as a background to their study: Phenomenology/Interpretivism, Symbolic Interactionism, Social Exchange Theory, and Negotiated Order Theory. Analysis revealed three major categories that were descriptive of the coach-athlete relationship: activity, interaction and care. Activity referred to actions that athletes and coaches performed before, during and after their practice or competition with or without other people being present. Interaction referred to the shared activities that are stimulated by other people's actions. Care referred to participants' affective and cognitive functions and this category was used to describe the previous two behavioural categories. Activity, interaction and care were further categorised as task- or maintenance-oriented. The context within which the participants operated and their relationships took place impacted on participants' perceptions of their dyadic relationship. The three categories were interdependently connected through circular relationships (e.g., more interaction resulted in greater care and greater care caused more interaction). Another finding revealed that the meaning that the participants attributed to the relationship expanded and complemented the three aforementioned categories through characterising the relationship in terms of its connotation (as positive or negative) and its intensity (weak or strong). Among the many themes that emerged from the analysis (e.g., manipulating styles, modelling, negotiating, protecting, sharing, interpretation and meaning) growth is of special interest. While previous studies have concentrated on athlete's growth regarding his/her performance and development as a person, the present study showed the coach's development in the professional and personal domains. Special reference was made regarding the relationship time-phases (pre-season, season and off-season) and developmental stages (i.e., beginning, testing, working, and ending stage).

Poczwardowski and colleagues' attempt to study the coach-athlete relationship provided an abundance of information. Several limitations were avoided with the systematic and combined approach they adopted in the data collection, analysis and interpretation phases of the study (e.g., empirical reductionism). Though, there is some degree of generalisability in their results, further studies are required to prove the model's applicability to male athletes, various levels of

sports participation, team sport contexts, participants at various ages, and coaches of different levels of experience.

A promising framework that seems to fulfil all the preconditions for (a) studying the coach-athlete relationship holistically and bi-directionally, and (b) investigating the cognitive, affective and behavioural element in the analysis, while at the same time taking into consideration individual and situational characteristics that may impact the perceptions of the coach and the athlete, is the model recently introduced by Jowett and colleagues (2001, 2002, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a; Jowett & Ntoumanis, 2004). What follows is a description of this recently introduced conceptualisation and model of the coach-athlete relationship.

2.2.4 The 3 + 1 Cs

2.2.4.1 Conceptualisation of the Coach-Athlete Relationship

Jowett and colleagues' conceptualisation - the 3+1 Cs. Based on Kelley et al.'s (1993) conceptualisation Jowett and colleagues (2001, 2002, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a; Jowett & Ntoumanis, 2004) developed a conceptual framework to examine the dynamics involved between the coach and the athlete from a relationship perspective. They adopted the definition of the dyadic relationship as it was described by Kelley et al. (1983) according to which a two-person relationship is the situation where two people's emotions, cognitions and behaviours are mutually and causally interconnected. Accordingly, the coach-athlete relationship was defined as the situation in which coach's and athlete's emotions, cognitions and behaviours are interdependent (Jowett, 2001; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004).

In order to study and measure the coach-athlete relationship, Jowett and colleagues operationalised the coach's emotions, cognitions and behaviours through conceptual constructs that were based on the mainstream psychology literature and more specifically in the interpersonal relationship and behavioural domains. An extensive search of the psychology literature revealed that emotions had been studied before through the constructs of closeness (Berscheid, Snyder and Omoto, 1989), cognitions through the construct of co-orientation (Newcomb, 1953) and behaviours through the construct of complementarity (Kiesler, 1997) in several psychology research realms, such as family, work and psychotherapy. Thus, the operationalisation of the coach-athlete relationship employed the constructs of closeness, co-orientation and complementarity (the 3 Cs) to mirror the constituents of coach's and athlete's

emotions, cognitions and behaviours. Although some of these constructs have been used before in sport studies, they have never been used in a conceptualisation concurrently.

Closeness refers to the emotional and affective element of the coach-athlete relationship. Previous research on this construct has concentrated either on the behavioural element of closeness “behaving close” (Berscheid, et al., 1989; Maxwell, 1985) or on the emotional element of “feeling close” (Rubin, 1973). The present deployment of the construct of closeness refers to feelings of trust, respect, and liking, reflecting the positive emotional aspect of the construct, and feelings of distrust, disrespect and disliking, reflecting the negative aspect of the construct. Co-orientation represents shared perspectives (common goals, values, beliefs, expectations) of the coach and athlete that are manifested through open channels of communication and implies, to a degree, compatibility in the coach-athlete relationship. Furthermore, co-orientation in the coach-athlete dyad refers to co-oriented views, to the shared knowledge and understanding of each other views. Complementarity reflects coach and athlete’s complementary or co-operative behavioural interactions (roles, tasks, support). Following the tenets of interpersonal theory (Kiesler, 1983), Jowett (2001; 2005) and Jowett and Cockerill (2002) operationalised complementarity in terms of two dimensions: (a) the reciprocity of the control dimension, where the person in the dominant position pulls submission from the person in the submissive position and vice versa, and (b) the correspondence of the affiliation dimension, where coach’s friendliness pulls athlete’s friendliness, and coach’s hostility pulls athlete’s hostility, and vice versa.

In the early steps of the development of this conceptualisation, a series of qualitative studies confirmed the utility of these constructs in describing and explaining the coach-athlete relationship. Once results from the qualitative studies employing these constructs had been used to develop a measurement instrument, a different set of constructs emerged. The development and validation of the Coach-Athlete Relationship Questionnaire (CART-Q: Jowett & Ntoumanis, 2004) revealed that while the two constructs of closeness and complementarity still reflected emotions and behaviours, the construct of co-orientation failed to account for the study of cognitions. Instead the construct of commitment emerged accounting for the athlete’s and the coach’s intention to maintain their athletic relationship, and thus representing the cognitive relational aspect of the coach-athlete relationship. A detailed description follows of the development and validation of the instrument and the re-introduction of the construct of co-orientation at a later stage, which resulted in the extension of the coach-athlete conceptualisation in terms of 3 Cs to a conceptualisation in terms of 3+1 Cs.

2.2.4.2 Measurement of the Coach-Athlete Relationship

Guided by the conceptualisation of the coach-athlete relationship in terms of the 3 Cs and based on the data and knowledge generated by the qualitative studies, Jowett and Ntoumanis (2004) developed a questionnaire to measure quantitatively the coach-athlete relationship. Following a three-phase process in their first study, they generated a pool of 39 items representing the constructs of closeness, co-orientation and complementarity; these items were evaluated by a panel of experts for content validity, reducing them to 23 and finally administering the questionnaire to test for concurrent validity. 120 British coaches and athletes of individual (80%) and team sports (20%), participating at various levels and representing typical and atypical coach-athlete dyads, were administered the 23-item questionnaire measuring athletes and coaches' ratings of their own closeness, commitment, and complementarity (direct perspective), along with two more items measuring satisfaction with the athletic relationship. Principal component analysis (PCA) was employed to extract the three factors that underlined the constructs of closeness, co-orientation and complementarity. Results showed that three components emerged. The first component included four items measuring closeness; the second component included three items measuring commitment; and the third component included four items measuring complementarity. Thus, PCA resulted in a three-factor and an 11-item solution. Interestingly, the construct of co-orientation was eliminated from the analysis and a new construct surfaced, which was termed "commitment" containing three items, whereas closeness and complementarity were representative of the other two components, containing four items each. The authors explained the unexpected finding of co-orientations' elimination in terms of its operational definition. In the early phases of coach-athlete relationship conceptualisation Jowett and her colleagues (Jowett & Meek, 2000a; Jowett & Cockerill, 2002) utilised the construct of co-orientation to describe the cognitive aspect of the athletic relationship in terms of verbal communication based on Duck's (1994) definition. Jowett and Ntoumanis (2004) suggested that it is more likely that co-orientation refers to the perceptual consensus experienced by the members of a relationship, as it was originally described by Newcomb (1953).

The 11-item structure of the Coach-Athlete Questionnaire (CART-Q) was further tested in the second study, through confirmatory factor analysis in a sample of 214 British coaches and athletes from individual (56%) and team sports (44%), representing various levels of participation and mostly with a typical coach-athlete relationship. Results from a competing-model comparison process showed that the coach-athlete relationship is a multidimensional

construct encompassing the aspects of closeness, commitment and complementarity. Moreover, regarding the criterion validity of the CART-Q, results showed that only the factors of Closeness and Complementarity could predict high levels of interpersonal satisfaction.

Conducting two more studies and using similar procedures, Jowett and Ntoumanis (2003) validated the CART-Q with Greek coaches and athletes. In the first study, the CART-Q was translated in Greek (GrCART-Q) and was administered to 182 Greek coaches and athletes with the majority competing in individual sports (91%) and various levels of participation. Exploratory factor analysis showed that the factors of Closeness and Complementarity were again soundly defined and operationalised by their corresponding items, whereas the factor of co-orientation was eliminated. The third factor was termed “commitment” corresponding to the English version of the CART-Q. Confirmatory factor analysis with a sample of 400 Greek coaches and athletes from individual and team sports and various levels of participation, confirmed the factor structure of the GrCART-Q. Moreover, regarding the criterion validity of the GrCART-Q results showed that only the factors of Commitment and Complementarity could predict high levels of interpersonal satisfaction.

Although results from these two studies place confidence in the generality of the conceptualisation of the coach-athlete relationship in terms of the three Cs, there is cultural specificity (Jowett & Ntoumanis, 2003). Greek athletes and coaches provided different meanings to the three constructs and these differences were attributed to cultural variations in terms of individualistic and collectivistic features.

Taken together all these studies provided evidence for the convergent, discriminant, and criterion validity of the CART-Q (direct/self-perception version) and its Greek version in coaches and athletes and in individual and team sports. Concluding, the CART-Qs and the GrCART-Qs measure the nature of the coach-athlete relationship through the constructs of closeness, commitment and complementarity, reflecting coaches’ and athletes’ meta-perceptions of the emotional, cognitive and behavioural elements respectively (Jowett, 2003, in press; Jowett & Ntoumanis, 2003, 2004). A possible reason for the elimination of the construct of co-orientation, which was hypothesised to measure the cognitive element of the athletic relationship, was attributed to its operational definition (Jowett & Ntoumanis, 2003, 2004).

Re-introducing Co-orientation

Jowett (in press) recommended that the study of the coach-athlete relationship in sports should entail and reflect the reciprocal and bi-directional nature of the relationship. Following this line

of thought, Jowett (2003, 2005) reintroduced the constructed of co-orientation, expanding the 3 Cs conceptualisation of the coach-athlete relationship to 3+1 Cs conceptualisation. The reintroduction co-orientation was guided by Kenny and Acitelli's (2001) paradigm of measuring assumed similarity and followed Laing, Phillipson, and Lee's (1966) tradition of studying interpersonal perceptions in various combinations to yield different aspect of co-orientation. Jowett (2002, 2003, 2005) explained that the two members of the coach-athlete relationship hold own perceptions not only about the other member in the relationship, but they also attempt to predict the views of the other person in the relationship towards them. The perceptions that the athletes hold for the other person (own perceptions) are termed direct/self-perceptions (e.g., I like my coach), whereas the attempt to accurately infer the other person views is termed meta-perception (e.g., My coach likes me).

Different combinations of the two sets of perceptions (i.e., self- and meta-perceptions) yield different aspects of co-orientation. Table 1 shows the three dimensions of co-orientation.

Table 1: Co-orientation in the coach-athlete relationship (adapted from Jowett & Cockerill, 2002)

| Sources of perceptions | Aspect of Co-orientation |
|---|--------------------------|
| 1. A's self-perception – C's self -perception <i>I like my coach – I like my athlete</i> | Actual Similarity |
| 2. A's self-perception – C's meta-perception/ <i>I like my coach – My athlete likes me</i> C's self-perception – A's meta-perception <i>I like my athlete– My coach likes me</i> | Empathic Understanding |
| 3. A's self -perception – A's meta-perception / <i>I like my coach – My coach likes me</i> C's self -perception– C's meta-perception <i>I like my athlete– My athlete likes me</i> | Assumed similarity |

Comparison between the athlete's and the coach's self-perceptions measures actual similarity or the level of correspondence and similarity in their views. Comparison between the athlete's/coach's self-perception and the coach's/athlete's meta-perceptions yields empathic

understanding, or else how accurately the two relationship members can infer the other person's perceptions. Lastly, comparison between athlete's self- and meta-perceptions yields assumed similarity, or the level of bias, shared illusion. Jowett and Clark-Carter (2005) explain that members in a relationship would be motivated to view the other person's perception to be similar to their own if they wanted to maintain the relationship. For example, an athlete who trusts his/her coach would assume that his/her coach trusts him/her back, otherwise the relationship would dissolve. Similarly, people are motivated not to view the other member in the relationship in a negative manner (Kenny & Acitelli, 2001). For example a coach who trusts his/her athlete would not want to see him/her as distrustful, because that would be threatening for the relationship (Ickes & Simpson, 1997; Krackhardt & Kilduff, 1998). Especially, in the early stages of the relationship people may closely observe the other person's behaviour and make inferences regarding their feelings and thoughts. The concept of empathic understanding has been a common theme in many sport psychology studies. Crouse (1984) discusses the notion of symbiosis between the coach and the athlete through the accomplishment of the same goals. He argues that a prerequisite for a successful symbiosis is the coach's ability to understand his athletes and accordingly modify his/her behaviour.

As noted earlier two studies were conducted in order to validate the English and Greek CART-Q versions used to measure athletes' and coaches' direct/self-perceptions (Jowett & Ntoumanis, 2003, 2004). Jowett (2002) modified the English version of the CART-Q, and later the Greek version (Jowett, in press) to measure coaches' and athletes' meta-perceptions. Measurement of coaches and athletes' meta-perceptions was accomplished by slightly modifying the CART-Q so that it would reflect the attempt of one member of the relationship to infer the other person's views (Jowett, 2002). Thus, for example, the item "I like my coach" that was used to reflect direct/self-perceptions of closeness was modified to "My coach likes me" to reflect meta-closeness. The 11-item modified English version was administered in 235 British athletes and coaches from individual and team sports from various levels of participation. Results from principal components analysis showed that three factors were extracted representing the factors of closeness, commitment and complementarity.

The Greek version of the CART-Q meta-perspective was administered to a sample of 280 coaches and athletes (140 coach-athlete dyads) from individual sports. Results from confirmatory factor analysis (CFA) revealed that the modified CART-Q reported a good fit both to the sample of coaches and the sample of athletes, lending evidence to its convergent validity and internal reliability. Overall, both English and Greek versions of the modified

CART-Q measuring athletes and coaches' meta-perceptions have been proved to possess good psychometric properties.

2.2.4.3 Research on Coach-Athlete Relationships Using the 3 Cs Conceptualisation

2.2.4.3.1 Qualitative Studies on the Coach-Athlete Relationship

In the first phase of the development of their conceptualisation, Jowett and her colleagues (2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000a), in order to ascertain the nature (quality and quantity) of the coach-athlete relationship, carried out several case studies employing the interpersonal constructs of closeness, co-orientation and complementarity to reflect athletes' and coaches' emotions, cognitions, and behaviours respectively. These studies were carried out in different relational contexts; the relationships of the coach-athlete dyads interviewed ranged from typical to atypical. The typical coach-athlete relationship referred to a coach and athlete who were not related to each other in any way other than as coach and athlete. An atypical coach-athlete relationship referred to a coach and athlete who had dual roles and affective ties such as marital, familial, and educational in addition to the athletic tie.

Specifically regarding the atypical coach-athlete relationships, Jowett and Meek (2000a) attempted through in-depth interviews to study four Greek married couples—the husbands were the coaches while their wives were track-and-field athletes—applying the interpersonal constructs of closeness, co-orientation and complementarity. Content analysis showed that personal feelings specific to the marital relationship e.g., love, and generic feelings related to the athletic relationship, e.g., respect, commitment or belief, characterised the coach-athlete relationship. Co-orientation emerged as an important element of the coach-athlete relationship in terms of shared knowledge and understanding, the common grounds, common goals and interests that the athlete and coach share. Dyads also perceived their relationship to be underlined by cooperative and complementary interactions; this confirmed the authors' suggestions that the two dimensions underly the construct of complementarity, namely reciprocity and correspondence. Overall, the elements of closeness (e.g., trust, liking, respect, being cared for and valued), co-orientation (e.g., shared knowledge and understanding), and complementarity (e.g., co-operative and complementary roles, tasks, behaviours) enhanced and promoted a healthy relationship as perceived by both coaches and athletes and helped them to avoid possible conflict. These results resemble the results of another qualitative study of a British familial coach-athlete relationship (Jowett & Meek, 2000b) in which the young athlete participated in athletics at an international level and her father was the coach. Results from content analysis supported the existence of the three constructs of closeness, commitment and

complementarity (the 3 Cs). A common issue that emerged in both studies concerned the negative aspects and feelings evident and associated with the duality of the relationships. Although in the first study negative feelings such as anger and frustration concentrated around the marital rather than the athletic relationship (Jowett & Meek, 2000a), in the second study the negative aspect involved the feeling of dissatisfaction due to the need to feel independent and capable of being responsible for her actions and completion of tasks (Jowett & Meek, 2000b).

In a similar vein, Jowett and Pearce (2001) examined the four typical coach-athlete dyads participating in national level swimming. Results supported the existence of the three constructs of closeness, co-orientation and complementarity that were manifested in a positive and negative dimension. Although, the percentage of negative phrases reflecting the 3 Cs was much lower than the percentage of positive phrases used to describe the coach-athlete relationship in terms of the 3 Cs, it was evident that both dimensions of the three constructs existed and were manifested.

Jowett and Cockerill (2003) examined the application of the 3 Cs in the typical coach-athlete relationship, as it was perceived by 12 Olympic medallists who had competed in the Olympic Games during 1968 and 1988. Athletes represented several countries and all performed at independent sports, namely athletics, gymnastics, sailing, swimming, and wrestling. Content analysis revealed that overall, athletes perceived the relationship with their coach to be a determinant of their development. The 3 Cs were discernible in the athletes' perceptions of the coach-athlete relationship and represented significant elements and salient aspects of the coach-athlete relationship. Lack of these elements was associated with negative consequences for the athletes' physical and psychological well-being. Furthermore, negative aspects of the coach-athlete relationship were more thoroughly investigated in another typical coach-athlete dyad from individual sport, which had worked together for a four-year period and achieved a silver medal in the 1996 Olympics in Atlanta (Jowett, 2003). Results from content analysis showed that closeness was underlined by personal and generic feelings whereas lack of closeness was underlined by feeling unattached and distressed. Co-orientation was characterised by shared knowledge and understanding whereas lack of co-orientation was characterised by discontention and contention. Complementarity consisted of reciprocal behaviours and helping transactions, whereas non-complementarity consisted of opposed behaviours and ineffectual support. The lack of the 3 Cs resulted in discontinuation of training sessions, disorientated state of affairs about important issues relevant to their athletic relationship (e.g., incongruent performance goals, and plans) and frustration. Overall, results

showed that within the frame of the 3 Cs conceptualisation of the coach-athlete relationship, the relationship was marked by high levels of closeness, co-orientation and complementarity in the first phase whereas negative relational components emerged and coexisted with the positive ones in the second phase.

All the qualitative studies described above aimed at exploring the coach-athlete relationship through the 3 Cs lens and provided evidence for the applicability of the conceptual model. Similarities and differences among the aforementioned studies concern methodological and conceptual issues.

At the conceptual level, feelings of closeness, co-oriented views and complementary behaviours were evident in all participants' accounts implying that they are salient components of the coach-athlete relationship, although their quantity and quality differed across studies (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000a, 2000b; Jowett & Pearce, 2001). Specifically, all qualitative studies revealed that both positive and negative facets emerged with regards to closeness and that personal and generic feelings typified the positive facet of closeness. Personal feelings of positive closeness were mentioned more often in the atypical relationships (Jowett & Meek, 2000a, 2000b) than the typical ones (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Pearce, 2001). Negative closeness was experienced more in the marital relationship (Jowett & Meek, 2000a) than in any other type of relationship. The two aspects of co-orientation, shared knowledge and understanding were equally observed in the marital cases (Jowett & Meek, 2000a), while shared understanding was more pronounced in the familial and typical cases (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000b; Jowett & Pearce, 2001). The negative aspect of co-orientation was very low across all cases. The positive aspects of complementarity, namely reciprocal behaviours and helping transactions, were reported across all studies, while the negative aspect of complementarity was recorded more frequently in the typical dyad (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Pearce, 2001) than the atypical cases (Jowett & Meek, 2000a, 2000b). The three constructs were found to be interrelated in different patterns across all studies.

Methodologically, in most of the qualitative studies both members of the marital and familial coach-athlete dyads were interviewed (Jowett, 2003; Jowett & Meek, 2000a, 2000b; Jowett & Pearce, 2001). Only the qualitative study involving the Olympic athletes followed a different interview format; whereas previous studies included both coaches and athletes in their interviews, this study did not involve interviewing the coaches (Jowett & Cockerill, 2003). The involvement of both coaches and athletes in the majority of the studies offered a more holistic

picture of the coach-athlete relationship. However, all the series of the qualitative studies have been conducted with athletes and coaches participating in individual sports, making the generalisability of the results difficult for team sports contexts (Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000a, 2000b; Jowett & Pearce, 2001). Bloom, Durand-Bush, Schinke, and Salmela (1998) noted that coaches and athletes are more likely to be locked into a relationship in individual sports as the amount of time that they are able to spend with their athletes on a one-to-one basis is not so limited as in team sports. Salminen and Liukkonen (1996) added that the athletic relationship grows to be close more easily in individual sports than team sports as the coaches in individual sports have more opportunities than coaches of large size teams to attend to their athlete's needs and get to know them better.

2.2.4.3.2 Empirical Research on the Coach-Athlete Relationship

Several studies have looked at the association between direct/self- and meta-perceptions of the 3Cs and satisfaction. Specifically, direct/self -perceptions of the coach-athlete relationship predicted interpersonal satisfaction with a British sample (Jowett & Ntoumanis, 2004), and meta-perceptions of the coach-athlete relationship predicted interpersonal satisfaction with a Greek sample (Jowett & Ntoumanis, 2003). Direct/self- and meta-perceptions of the coach-athlete relationship were found to predict athletes' and coaches' satisfaction with their relationship in a sample of 151 athletes and 84 coaches from team and individual sports of different performing levels across the UK (Jowett, 2001). Perceived satisfaction with individual performance, training and instruction, personal treatment and personal dedication were also examined in association with athletes' self-perceptions of the 3 Cs with 88 English university athletes participating in team sports (Jowett & Don Carolis, 2003). Results from standard multiple regression analysis showed that only athletes' complementarity with their coach predicted satisfaction with individual performance. Gender differences were also found in the way athletes perceived the coach-athlete relationship. Specifically, females perceived higher levels of closeness, commitment and complementarity compared to male athletes.

Adopting Kenny and Accitelli's (2001) methodology, Jowett and Clark-Carter (2005) examined the presence of empathic accuracy and assumed similarity in 140 coach-athlete dyads and their ability to predict athletes' self- and meta-perceptions of satisfaction with training, performance, and external agents. Results provided evidence for the existence of empathic accuracy and assumed similarity in coaches and athletes' perceptions of the coach-athlete relationship. Moreover, coaches and athletes' empathic accuracy with regards to commitment predicted athletes' satisfaction with individual performance.

Jowett and Chaundy (2004) examined fundamental variables that relate to team sports such as team cohesion in relation to the 3 Cs conceptualisation of the coach-athlete relationship. Specifically, they looked at how direct/self- and meta-perceptions of the 3 Cs as well as perceived similarity add to the prediction of task and social cohesion by the leadership dimensions. Perceived similarity was operationalised as the interaction term between athletes' direct/self- and meta-perceptions of the 3 Cs. They employed 111 university team sport athletes and administered the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985), the Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1978), and the Coach-Athlete Relationship Questionnaire (CART-Q; Jowett, 2002; Jowett & Ntoumanis, 2004) to measure team cohesion, coach leadership and perceptions of the coach-athlete relationship respectively. Results from multiple regression analysis showed that self-perceptions enhanced the variance accounted for in task cohesion by the leadership dimensions. Meta-perceptions or perceived similarity did not add to the explained variance. They explained this finding in terms of the underlying goal of coach leadership and coach-athlete relationship, which was the creation of a climate in which team members work together to produce effective outcomes for the team. Moreover, perceived similarity accounted for an extra 3% of the variance in social cohesion, whereas direct/self - and meta-perceptions did not add to the explained variance. Jowett and Chaundy (2004) stated that a prerequisite of social cohesion (i.e., when athletes like each other) is athletes' perceived similarity with their coach, which in turn reflects their level of affiliation (Byrne, 1971). They concluded that although meta-perceptions did not impact directly on dimensions of cohesion their influence can be detected in the link between perceived similarity and social cohesion.

Concluding, results from the studies undertaken to ascertain the nature of the coach-athlete relationship in terms of the 3 Cs and 3+1 Cs conceptualisation offered invaluable information and extended our knowledge in the sport domain. Jowett (2001) hypothesised that the coach-athlete relationship must be viewed as a dynamic and continuous process that goes through phases, and within these phases the organisation of the constructs of closeness, co-orientation and complementarity differs. The first phase has been termed *acquaintance* in which the relationship starts to develop between the coach and the athlete. Once this phase is completed the *building up* phase takes place followed by the *continuation* phase. The last phase of the relationship life cycle, the dissolution phase signals the end of the athletic relationship but not always necessarily in a negative way.

2.2.5 Parallel Comparisons among the Theoretical Frameworks of the Coach-Athlete Relationship

Jowett and colleagues vs. Wylleman's and Poczwadowski and colleagues' framework. All three models of the coach-athlete relationship presented so far have similarities and overlapping areas. Firstly, the issue of bi-directionality, addressed by Wylleman and Poczwadowski and colleagues, was differentially treated by Jowett in the 3+1 Cs conceptualisation. Wylleman approached bi-directionality by asking the athletes about their perceptions of the relationship and their opinions about their coaches and parents opinions on the relationship. By addressing only athletes' perceptions on the bi-directional nature of the interpersonal relationship, one cannot comprehend the bi-directionality of the relationship. Poczwadowski and colleagues referred to bi-directionality by taking into consideration both coach's and athlete's self-perceptions. Jowett and colleagues further extended this concept by addressing coaches' and athletes' meta-perceptions of each other. Accordingly, the aspect of co-orientation introduced recently by Jowett (2002) addresses the issue of conflict and identifies the problematic areas in the athletic relationship by measuring athletes' and coaches' empathic accuracy/ understanding, assumed, and actual similarity.

Secondly, the socio-emotional content of the coach-athlete relationship in Wylleman's model was addressed by incorporating coaches' and athletes' feelings and thoughts on the one hand and by addressing their complementarity in terms of their roles and tasks in the relationship. Poczwadowski and colleagues utilised care as a category to describe cognitively and emotionally the coach-athlete relationship reflecting like/dislike, knowledge, respect, belief, trust and pride. Jowett and colleagues separated emotional and cognitive elements to formulate distinct categories and employed different constructs to describe emotions and cognitions (i.e., closeness and commitment respectively).

Thirdly, interaction, as it was conceptualised in Poczwadowski and colleagues' framework, was captured in Jowett and colleagues' framework by the complementarity subscale which itself is broad enough to include the dominance and submission element that was addressed in the Wylleman's framework.

Whereas the framework of Poczwadowski and colleagues provided the sport psychology literature with invaluable information on the content and quality of the coach-athlete relationship, its application is limited as there is no quantifiable methodology offered to measure the athletic relationship. On the other hand, Wylleman's and Jowett's frameworks through the development of the SIRQ and CART-Q respectively enabled the measurement of

the athletic relationship between the coach and the athlete in an objective and quantifiable way, facilitating the counselling process.

Wylleman's relationship model is more applicable to young and adolescent athletes where the parents' and coaches' influences are more salient and the transitional stages are more prominent. On the other hand, Jowett has worked with adolescents and older adults. Overall, Jowett and colleagues conceptualisation of the coach-athlete relationship is a valid and holistic approach that combines basic elements from Wylleman's (2000) and Poczwardowski and colleagues' coach-athlete relationship frameworks.

2.3 Synopsis, Research Objectives, and an Integrated Model

Drawing from the literature review the following points were addressed:

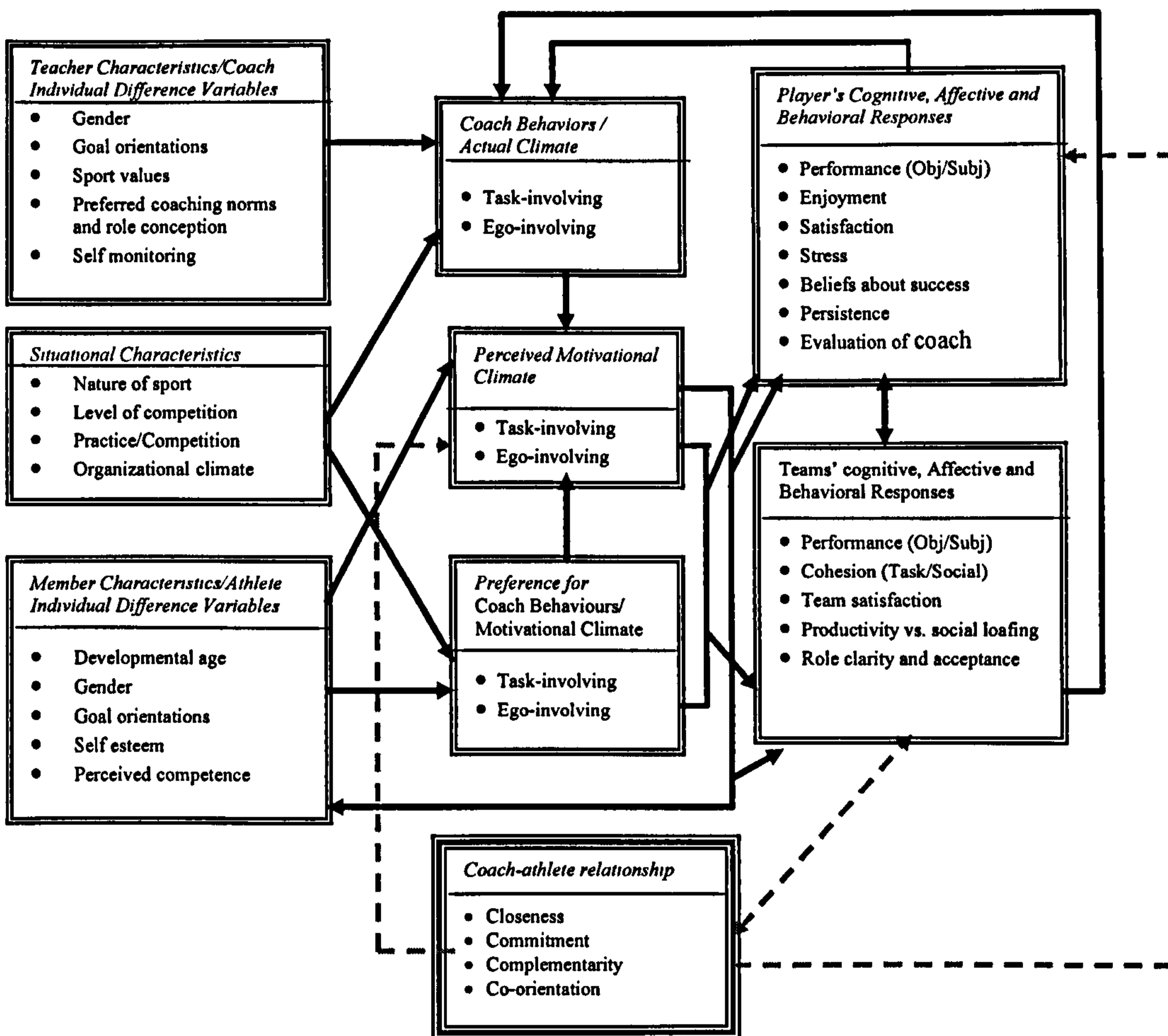
- The study of the social context in terms of the motivational climate or the interactions and relationship between coach and athlete is crucial for our understanding of the athletes' sporting experience.
- Both social contexts have serious implications for the cognitive, affective and motivational responses of the athlete.
- The study of coach-athlete interactions from a leadership approach does not suffice for delineating the coach-athlete relationship.
- There is a growing call for integration of different areas in sport psychology for a better and a more holistic understanding of the athlete's experiences.

Based on Duda and Balaguer's integration of motivation and leadership, it is suggested that a further extension of the model to incorporate perceptions of the coach-athlete relationship will expand our understanding of the factors that enhance or impinge on motivational patterns. Thus, the general aims of the research are the following:

- To extend previous research on the motivational climate by incorporating the conceptualisation of the coach-athlete relationship as perceived by the athletes.
- To examine the association between athletes' perceptions of the motivational climate and the coach-athlete relationship in team sports.
- To provide evidence on the association between the two constructs at a particular point in time and as a function of time.
- To study the association between motivational climate and the coach-athlete relationship in a wider context of motivation incorporating outcome variables and mechanisms of influence.

As Jowett and colleagues conceptualisation of the coach-athlete relationship seems a promising avenue of investigating the athletic relationship as it is experienced by both the athletes and the coaches, and given the limited scope of the leadership approaches in examining the relationship between the coach and the athlete, it was deemed appropriate to incorporate the 3+1 Cs model to the integrated model of leadership and motivation. The extended model can be seen in Figure 2.

Figure 2: Extended model of leadership and coach-athlete relationship.



2.4 Summary

Literature relevant to key elements and concepts of the studies undertaken in this thesis have been reviewed above. Invariably, studies concerning the achievement goal and the coach-athlete relationship theory show an overarching concern with the context in which achievement motivation occurs. It was indicated that athletes' perceptions of the goal structures emphasised by their coach as well as perceptions of their athletic relationship with their coach have an impact on athletes' cognitive, affective and behavioural motivational patterns. The review also indicated that a synthesis of theories is warranted. One of the areas of psychology proposed for integration with motivation was the coach leadership approach. In reviewing the leadership literature, major limitations were identified when leadership researchers proposed to study the coach-athlete interaction. The 3+1 Cs conceptualisation was

indicated as a possible alternative for studying the coach-athlete relationship from a relationship perspective. In that respect, the literature review above situated the proposed integrated model in a wider theoretical and empirical framework and in doing so, it both supported and elaborated key aspects of the model guiding the present research.

Having established the empirical and theoretical framework the next chapter, Chapter III, provides empirical evidence on the association of perceptions of the motivational climate and perceptions of the coach-athlete relationship. In particular, the study undertaken demonstrates how the present research both complements and extends the empirical and theoretical studies reviewed above. Chapter IV provides evidence on the change and stability of the two concepts and their relationship over an academic season. Chapter V situates the contextual factors of motivational climate and coach-athlete relationship in Duda and Balaguer's (1999) integrated model testing associations between various consequences and brings tenets from self-determination theory into the equation. Chapter VI summarises and discusses the findings, integrating concepts and ideas for future implementations and interventions.

CHAPTER 3

STUDY 1

ASSOCIATIONS BETWEEN ATHLETES' PERCEPTIONS OF THE COACH-ATHLETE RELATIONSHIP AND THE MOTIVATIONAL CLIMATE

3 Study 1: Associations between Athletes' Perceptions of the Coach-Athlete Relationship and the Motivational Climate

3.1 Introduction

Associations between perceptions of the motivational climate and coaching behaviours have been recently examined (e.g., Balaguer et al., 2002; Balaguer et al., 1999) combining the two fields of achievement goals and leadership. Balaguer and her colleagues' (Balaguer et al., 2002; Balaguer et al., 1999; Balaguer, Duda, & Mayo, 1997) findings revealed that task-involving climate was associated with players' satisfaction with the amount of concern and training and instruction they were given by their coach. Particularly, in these series of investigations, players' perceptions of a task-involving climate positively correlated with players' perceptions of their coach as the ideal coach, and players felt that not only their coach engaged in more training and instruction but provided more social support as well. An atmosphere that emphasised task-involvement was found to promote more positive perceptions of the application of the coach's role, namely that their coach did his/her best to help athletes maximise their training and performance. These findings are in agreement with Duda and Balaguer's (1999) model postulations and point to the importance of the perceptions of the motivational climate in influencing the team's perceptions of coaching behaviours and subsequent satisfaction and perceptions of performance. Such a coach-created climate should promote a more self-referenced and mastery-focused manner in which athletes judge and evaluate their coach as more close to their ideal coach; recognise the significant role that their coach can play as part of their development in learning and mastering skills; and finally experience greater satisfaction and improvement. The criteria laying the bases for judgements of the adequacy of level of play and improvement are therefore more within the athlete's and the team's control when the environment is task-involving, encouraging athletes' exertion of effort and perceptions of choice and contribution to the team decision-making. Task-involving climates increase the likelihood of athletes extending and sustaining their participation in sport over time (Fry & Newton, 2003).

Perceptions of an ego-involving climate on the other hand, revealed a different pattern of associations opposite to the positive one described earlier. When athletes perceived

that an ego-involving atmosphere prevailed, they held lower views for the coach regarding his/her role in training and instruction and the provision of social support (Balaguer et al., 2002; Balaguer et al., 1999). Balaguer et al. (1999) argued that the adoption and promotion of task-involving vs. ego-involving goal perspectives are more likely to promote positive evaluations of the coach and his role in providing training and instruction.

Aligned with the previous findings (Balaguer et al., 2002; Balaguer et al., 1999; Balaguer, Duda, & Mayo, 1997) and given the limitations of the leadership approach to take into account both coach and athlete's feelings, cognitions and behaviours, it is hypothesised in the present study that the *coach-athlete relationship* rather than the *coach's behaviours* can be conceptualised in task- and ego- involving features. Thus, it would be interesting to investigate the manner to which the relationship between the coach and the athlete associate as strongly as the coach's leadership with perceptions of the motivational climate.

Jowett and her colleagues (e.g., Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004) recently proposed a conceptualisation of the coach-athlete relationship postulating that it can be studied through the key constructs of closeness, commitment and complementarity. The construct of closeness captures the affective element of the athletic relationship between the coach and the athlete, and the degree of their emotional connection. The construct of commitment refers to their long-term orientation towards their athletic relationship and is manifested through intentions to persist (Jowett, 2001). The construct of complementarity reflects the type of interaction that the coach and the athlete perceive. Acknowledging Jowett and her colleagues' work and the potency of examining athletes' behaviour in the context of their relationships with coaches, it is proposed that it is valuable to study the potential motivational processes contained in the coach-athlete relationship. How do these social-environmental factors that purport to explain the coach-athlete relationship and climate associate with each other?

Dissecting the meanings of the components and elements that constitute the coach-athlete relationship and the motivational climate, it is suggested that many similarities can be drawn between the two theories. For example the element of closeness in the coach-athlete relationship comprises feelings of liking that refers to similarity, respect, and trust. According to Jowett (2001) fairness, worth, empathy, and communication

are positively related and can enhance trust. This concept resembles the meaning attributed to the 'important role subscale' of the task-involving motivational climate, which is that of fairness. In an emotionally close coach-athlete relationship, coaches are more likely to promote fairness, and the coach to recognise that all the athletes' contribution is necessary for the success of the team, while athletes will experience more trust and respect for the coach. Athletes who trust their coach are more likely to try harder as they believe that coach is there to help them improve and excel. In an emotionally distant coach-athlete relationship, feelings of trust and respect are reversed and the probability that the athletes perceive the coach to cultivate inter-team competition and rivalry and fostering favouritism is greater.

The construct of commitment that entails the element of intention and of future direction, places emphasis on the role of the coach in the athlete's future athletic development. This construct bears many similarities with the effort/improvement subscale of the task-involving motivational climate; in such a climate the coach's emphasis is on athletes' improvement of their skills and enhancement of their weak points, through effort, practice and trying one's best. Thus, athletes and coaches that are committed to their athletic relationship are more likely to perceive that a focus on effort and practice will lead to future success.

The element of complementarity as the behavioural component of the coach-athlete relationship involves reciprocal interactions and behaviours of affiliation. Athletes perceiving a cooperative and friendly coach-athlete relationship are more likely to reflect the same level of co-operation within the relationships with their teammates, and exert more effort in order to improve their skills and performance.

Overall, athletes who trust, like, respect their coach, are committed to their athletic relationship and believe that this partnership will help their athletic development and sport evolution, and that in their athletic interactions with the coach there are high levels of cooperation and responsiveness, are more likely to cooperate well with the other teammates, in order to learn more skills, techniques, and strategies and master them, will feel more motivated to apply more effort and improve more, and will perceive that the coach treats all athletes equally.

Conversely, when athletes perceive low levels of closeness, commitment and complementarity within the athletic relationship with their coach, they will be less

likely to engage in cooperative interactions with their teammates, but rather a climate of competition will be salient among the players in a team, and the general emphasised goals will centre around winning. Athletes that feel little respect and trust for their coach are more likely to be less committed to the athletic relationship and as a result little effort in terms of improvement will be exerted on their own and their coach's part. The athletes who perceive that the coach's focus is on the stars of the team due to their capability of producing good results are likely to feel disregarded. It might also be more possible that the coach views mistakes as lack of ability and not as part of learning. The overall climate will not be conducive to a close, warm, affective, and caring relationship between the coach and the athlete. Since the focus will not be on the welfare and well-being of the athlete the coach-athlete relationship will not serve as a vehicle towards the psychosocial development of the athlete, but rather as a means towards the end of success, and personal glory. Concluding, one can assume that both constructs, namely motivational climate and coach-athlete relationships capture the social context involving the coach and the athlete from two different angles; the former construct approaches the social context from a motivational angle, whereas the latter from a relationship perspective.

Within this line of reasoning and grounded on Duda and Balaguer's (1999; Duda, 2001) integrated model of motivation and coaching behaviours, the main aim of this study was to investigate the links between the motivational climate and the coach-athlete relationship as it has been approached by Jowett and colleagues (Jowett & Cockerill, 2002; Jowett & Meek, 2000a; Jowett & Ntoumanis, 2005). Accordingly, the main objective of this study was to examine the link between the two constructs in a sample of athletes who participate in *team* sports. It was thus, hypothesised that athletes' perceptions of the motivational climate would be related to their perceptions of the coach-athlete relationship in a conceptually coherent fashion. This hypothesis implies that athletes through their athletic relationships with their coaches influence, and are influenced by, achievement goal structures.

A key point in this study was the focus on a micro level of analysis. That is, the main intention was to capture the contributions of the *specific elements* of the coach-athlete relationship and the motivational climate. Thus far, the motivational climate literature has concentrated on the macro level of analysis, namely, the two dimensions of the motivational climate (i.e., task and ego-involving climate). To this end Seifriz et al.

(1992) had developed an instrument, the PMCSQ which tapped the two dimensions of the motivational climate proposed by the theory. Nevertheless, recently, Newton et al. (2000) developed the PMCSQ-2 in an attempt to strengthen the conceptualisation of the measurement of the motivational climate. Thus, driven by the theory Newton et al. addressed the underlying dimensions of the task- and ego-involving subscales. Since the development of the new instrument, all the studies that have examined the motivational climate using the PMCSQ-2 focused on the higher order dimensions, and none of them has addressed the contribution of the subscales comprising the higher order dimensions to the relationship or prediction of other related variables (e.g., Balaguer et al., 2002; Balaguer et al., 1999; Fry & Newton, 2003; Gano-Overway & Ewing, 2004; Gano-Overway et al., 2005; Magyar & Feltz, 2003; Newton & Duda, 1999; Reinboth & Duda, 2004; White, Kavussanu, & Guest, 1998; Whitehead et al., 2004; Williams, 1998). Even in the Treasure and Roberts' (1998) study, where canonical correlations were conducted only the higher order subscales of task and ego climate were used. Due to this gap in the literature, it was interesting to explore in the present study, which facets of the motivational climate contribute to relationships with other variables mostly, as motivational climate is a broad term encompassing a variety of goal structures and elements of the environment emphasised by the coach. It might be that some aspects of the motivational climate are irrelevant to the study of the coach-athlete relationship. This detailed information would help sport psychologists to focus on only the relevant aspects of the climate and the coach-athlete relationship when designing an intervention practice. Manipulations of the most important aspects that make up the social context in sport contribute to the economy of the intervention; simplify the procedures; and produce better results.

It was also shown from previous studies that certain motivational climate subscales failed to reach acceptable reliability levels, thus pausing questions as to how well the different aspects of the motivational climate were represented in the PMCSQ-2 (Balaguer, et al., 1997; Newton et al., 2000; Treasure & Roberts, 1998). Thus, the researcher decided to use a micro-level analysis not only to examine which motivational climate features contribute more to associations with other variables (i.e., the coach-athlete relationship), but also to examine which motivational climate features measure accurately the motivational climate.

Furthermore, the literature review revealed that male and female athletes hold different perceptions of the motivational climate and the coach-athlete relationship. Research findings pertaining to gender differences in athletes' perceptions of the motivational climate in sport have been diverse. It was shown that female athletes perceived less of an ego-involving climate compared to male athletes (Kavussanu & Roberts, 1996; Li, Lee, & Solmon, 2003; Miller, Roberts, Ommundsen, 2005; White, Kavussanu, & Guest, 1998), while in another study no differences were found between male and female perceptions of the climate (Petherick & Weingand, 2002). Thus far, gender differences have not been discussed extensively within motivational climate research, but rather briefly mentioned as demographic details.

Research has also indicated that female athletes perceived higher levels of closeness, commitment, and complementarity with their coach (Jowett & Don Carolis, 2003) than male athletes. The fact that male and female athletes hold different perceptions of the social environment should not be surprising. Sport is part of society and as such is a reflection of it. It might be that the responses reflect socially desirable answers matching the gender stereotypes reinforced by the society. Therefore, a subsequent aim of this study was to examine the role of gender in athletes' perceptions of the motivational climate and the coach-athlete relationship.

Moreover, measurement of the coach-athlete relationship following Jowett and colleagues' conceptualisation of the 3+1 Cs has only been initiated recently. While the development of the CART-Q for measuring self-perceptions (Jowett & Ntoumanis, 2004) was followed by confirmation and validation of its factor structure, the development of the CART-Q in order to measure meta-perceptions by Jowett (2002) included only exploratory factor analysis. Exploratory factor analyses for both CART-Q versions (i.e., self- and meta-perceptions versions) showed a clear three-factor structure reflecting the relational components of Closeness, Commitment and Complementarity. Yet confirmation of the factor structure of the CART-Q/meta-perceptions still awaited further investigation.

Although, both versions of the CART-Q exhibited good psychometric properties with heterogeneous samples, in the sense that they included coaches and athletes from team and individual sports, it seemed useful and appropriate to conduct a Confirmatory Factor Analysis (CFA) investigation of the factorial validity of both of these instruments in order to ascertain their structure with a sample of athletes specifically

from team sports. It has been suggested that situational and organisational variables, such as the context of sport (i.e., team vs. individual), constitute an important factor influencing the athlete's perceptions of their coach's leadership style, or the athletic relationship they formulate with their coach (Chelladurai, 1993; Jowett, Paull, & Pensgaard, in press). Moreover, it has been argued that the large size of a sport team provides the coach with fewer opportunities to interact and communicate individually with each one of the members of the team (Carron, Brawley, & Widmeyer, 1990; Widmeyer, Brawley, & Carron, 1990). Anecdotal evidence though, suggests that players from team sports, such as football, launch intense and strong relationships (see David Beckham, 2003, and Roy Keane's 2002 autobiographies). Accordingly, it seemed potent to examine the factorial validity in both CART-Qs with team sport performers, in order to place confidence in the results that the CART-Q generates when it is used to measure the coach-athlete relationship in team sports.

Following Carron and Brawley's (2000) suggestions on conducting CFA with a broad-based sampling procedure, the present study concentrated on detecting perceptions of a wide range of sports from a similar social context (i.e., team sports), at different stages of development, and with heterogeneous membership characteristics (e.g., participation level, experience of playing this particular sport, time spent with team, time spent with coach). A consideration of all the aforementioned issues outlined the three hypotheses of the first study, which are presented below.

3.1.1 Research Hypotheses

Three specific research hypotheses were explored in terms of:

CFA: This study's first aim was to illuminate whether a three first-order factor structure or a second-order factor structure best represents the coach-athlete relationship with a sample of athletes performing in team sports. Furthermore, this study aimed to examine whether comparative structures fit well the meta-perception version of the CART-Q. These two research hypotheses constituted the two sub-aims of the first study.

Gender Differences: Female athletes would perceive higher levels of closeness, commitment and complementarity than male athletes. Additionally, female athletes would perceive higher levels of cooperative learning, effort/ improvement, important

role and lower levels of punishment for mistakes, unequal recognition and intra-team rivalry than male athletes.

Associations: Perceptions of a task-involving climate would be associated with perceptions of a strong coach-athlete relationship. Specifically, high closeness, commitment and complementarity in both athletes' self- and meta-perceptions would be associated with perceptions of high cooperative learning, effort / improvement and important role. Moreover, perceptions of an ego-involving climate would be associated with perceptions of low closeness, commitment and complementarity in both athletes' self- and meta-perceptions. Specifically, low closeness, commitment and complementarity in both athletes' self- and meta-perceptions would be associated with perceptions of high punishment for mistakes, unequal recognition and intra-team rivalry. Examination of the associations between motivational climate and coach-athlete relationship perceptions constituted the main hypothesis and objective of the study.

3.2 Methodology

3.2.1 Participants

A total of 591 British athletes from team sports (football, rugby, volleyball, basketball, field hockey, ice hockey and roller hockey) participated in the study from which 414 (70%) athletes were male and 177 (30%) athletes were female. The age of participants ranged from 16 to 36 years of age. Different levels of sport performance were represented: 90 (15%) athletes performed at the highest level of their sport (e.g., premiership), 227 (38%) athletes performed at national and county levels, whereas the remainder of the athletes (274, 46%) performed at regional level, club level or recreational level. Over half (308, 51%) of the athletes had a new relationship with coach (less than 6 months) in terms of actual time spent with their coach, 171 (30%) had a newly developed relationship with coach (6 months to 2 years), and the remainder 117 (20%) athletes had a more established relationship with coach that spanned over 2 years.

3.2.2 Instrumentation

Coach-Athlete Relationship: The Coach-Athlete Relationship Questionnaire/ self-perceptions (CART-Q self-perceptions: Jowett & Ntoumanis, 2004) were employed to measure athletes' perceptions of closeness (feelings of trust, respect, like), commitment (thoughts about the future of the relationship), and complementarity (co-operative interactions during practice sessions). More specifically, the CART-Q self-perceptions version measures athletes' rating of own closeness (4 items), commitment (3 items), and complementarity (4 items) with coach. For example, an item from the closeness subscale is "I trust my coach"; an item from the commitment subscale is "I am committed to my coach"; and an item from the complementarity subscale is "When I am coached by my coach, I am ready to do my best". The items are assigned a score ranging from *strongly disagree* (1) to *strongly agree* (7). For this sample, the internal consistency scores of the CART-Q self-perception subscales were, .87 for Closeness, .81 for Commitment, and .85 for Complementarity.

The Coach-Athlete Relationship Questionnaire/ meta-perceptions (CART-Q meta-perceptions: Jowett, 2002) was utilised to assess athletes' meta-perceptions of their athletic relationship with their coach. The CART-Q meta-perception version measures athletes' perceptions of their coaches' rating of interpersonal feelings, cognitions and behaviours respectively. In effect, the modified CART-Q provides scores of meta-closeness (4 items; e.g., My coach trusts me), meta-commitment (3 items; e.g., My coach is committed to me), and meta-complementarity (4 items; e.g., My coach believes that when I am coached by him/her, I am ready to do my best). Responses to the meta-perception version were also made on a seven-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). For this sample, the internal consistency scores of the CART-Q meta-perception subscales were, .84 for Closeness, .79 for Commitment, and .87 for Complementarity. Both the self- and meta-perceptions version of the CART-Q include a total of 22 items (11 items each questionnaire).

Motivational climate: The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) (Newton, Duda, & Yin, 2000) was utilised in order to assess athletes' perceptions of the motivational climates in their teams. Twenty-nine (29) items from the PMCSQ-2 with a 5-point response scale, (1=strongly disagree to 5=strongly agree) were utilised. The questionnaire includes two higher-order dimensions, the perceived task-involving climate and the perceived ego-involving climate; each contains three

first-order dimensions. The task-involving climate scale contains the dimensions of: 'cooperative learning', (e.g., "the coach encourages players to help each other") 'effort/improvement' (e.g., "players are encouraged to work on their weaknesses"), and 'important role' (e.g., "each player has an important role"). The ego-involving climate scale contains the dimensions of: 'intra-team member rivalry' (e.g., "players are encouraged to outplay the other teammates"), 'unequal recognition' (e.g., "the coach has his/her own favourites"), and 'punishment for mistakes' (e.g., "the coach gets mad when a player makes a mistake"). Both the higher-order scales have reported high reliabilities (task-involving $\alpha = .88$; ego-involving $\alpha = .87$), and the first-order subscales have also reported reliabilities over .70 except for intra-team member rivalry subscale ($\alpha=.54$) (Newton et al., 2000; Treasure & Roberts, 1998). For the present study the Cronbach alpha coefficients were for the subscale of effort/improvement .78, for the subscale of important role .80, for co-operative learning .82, for punishment for mistakes .80, for unequal recognition .83, and finally for the intra-team member rivalry subscale .56. Because of the low reliability score, the subscale of intra-team member rivalry was excluded from subsequent analysis.

3.2.3 Procedure

Prior to any action taken by the researcher to contact the participants, a proposal was completed and sent to the ethical committee of the School of Sport and Exercise Sciences to seek their approval. The proposal included information on (a) the nature of the research conducted and the procedures followed, (b) the recruitment of the subjects and the instrumentation, (c) a reassurance that no risk, harm, or other hazards would be caused to the participants, (d) a reassurance that the welfare of the participants would be paramount at all times.

On receiving the consent from the ethical committee, a letter was prepared and sent to principal coaches of a large number of teams across England. The name, affiliation and status of the researcher were declared to all participants. The letter included information concerning the purpose of the study and descriptions of what would be required of them once they consented to participate. Anonymity and confidentiality were guaranteed, as well as voluntary participation in the study. Coaches were subsequently contacted by phone to confirm their participation. Upon agreement, a mutually convenient date was arranged to meet and administer the questionnaires to

the athletes. Administration of questionnaires took place on the teams' training grounds. Participant athletes completed the questionnaires before the commencement of a training session. Data were collected during a nine-month period.

3.2.4 Data Analysis

Following calculation of internal reliability, descriptive statistics and bivariate correlations, Confirmatory Factor Analysis (CFA) was conducted in order to address the first objective, namely, to test the factor structure of the CART-Q/self-perception and the meta-perception version. To address the second purpose of the study, one-way MANOVA was conducted to test for gender differences in athletes' perceptions of the motivational climate and the coach-athlete relationship. The associations between the features of the motivational climate and the elements of the coach-athlete relationship were examined through performing canonical correlation analysis.

3.3 Results

3.3.1 Descriptive Statistics

Table 2 contains mean, standard deviation, skewness, and kurtosis scores for each of the subscales of the questionnaires employed. All mean scores were relatively high for the 3 Cs (self- and meta-perceptions) and for the task-involving climate (co-operative learning, effort/improvement, and important role). The scores for the CART-Q subscales (self- and meta-perceptions versions) and for PMCSQ-2 subscales' were negatively skewed. For the CART-Q/self-perceptions, the values of skewness ranged from $-.67$ to -1.80 , whereas the kurtosis values ranged from $.51$ to 4.24 . The values of skewness for the CART-Q/meta-perceptions ranged from $-.39$ to -1.01 , whereas the kurtosis values ranged from $.54$ to 2.14 . For the PMCSQ-2, the values of skewness ranged from $-.88$ to $.46$, and the kurtosis values ranged from $-.40$ to 2.45 . The values of skewness and kurtosis for all questionnaires indicate univariate normality in the distribution of the obtained data.

Table 2: Descriptive Statistics of the CART-Q and PMCSQ-2 subscales for Study 1

| WHOLE SAMPLE | MALES | FEMALES |
|--------------|-------|---------|
|--------------|-------|---------|

| | M | SD | Sk | Kurt | M | SD | Sk | Kurt | M | SD | Sk | Kurt | |
|---------------------------------|------|------|-------|------|------|------|-------|------|------|------|------|------|------|
| <i>CART-Q/ self-perceptions</i> | | | | | | | | | | | | | |
| Self- Commitment | 4.90 | 1.17 | -.76 | .72 | 5.08 | 1.12 | -.84 | .99 | 4.48 | 1.19 | -.67 | .51 | |
| Self-Closeness | 5.60 | 1.11 | -1.50 | 2.97 | 5.71 | 1.11 | -1.80 | 4.24 | 5.36 | 1.07 | -.93 | 1.03 | |
| Self-Complementarity | 5.44 | 1.04 | -1.30 | 2.62 | 5.55 | 1.03 | -1.57 | 3.87 | 5.18 | 1.03 | -.82 | 1.05 | |
| <i>CART-Q/ meta-perceptions</i> | | | | | | | | | | | | | |
| Meta-Closeness | 5.11 | 1.00 | -.83 | 1.36 | 5.20 | 1.02 | -1.01 | 1.87 | 4.91 | .92 | -.47 | .54 | |
| Meta-Commitment | 4.69 | 1.08 | -.60 | .78 | 4.81 | 1.05 | -.60 | .80 | 4.40 | 1.08 | -.62 | .85 | |
| Meta-Complementarity | 5.19 | .96 | -.73 | 1.47 | 5.27 | .95 | -.90 | 2.14 | 5.00 | .96 | -.39 | .60 | |
| <i>PMCSQ-2</i> | | | | | | | | | | | | | |
| Punishment Mistakes | for | 2.59 | .77 | .19 | -.35 | 2.72 | .77 | .05 | -.27 | 2.29 | .68 | .46 | -.08 |
| Unequal Recognition | | 2.77 | .81 | .09 | -.40 | 2.87 | .82 | -.04 | -.35 | 2.54 | .73 | .31 | -.23 |
| Intra-Team Rivalry | | 2.97 | .76 | -.08 | -.26 | 3.07 | .77 | -.26 | -.03 | 2.72 | .69 | .27 | -.26 |
| Important Role | | 3.97 | .65 | -.77 | .87 | 3.97 | .68 | -.86 | 1.09 | 3.98 | .58 | -.41 | -.35 |
| Cooperative Learning | | 4.02 | .66 | -.84 | 1.54 | 4.01 | .68 | -.88 | 1.57 | 4.06 | .60 | -.61 | 1.06 |
| Effort/ Improvement | | 4.08 | .50 | -.68 | 1.93 | 4.09 | .51 | -.79 | 2.45 | 4.04 | .47 | -.38 | .43 |
| Ego Climate | | 2.78 | .65 | .10 | -.26 | 2.89 | .65 | -.09 | -.06 | 2.52 | .58 | .54 | .12 |
| Task Climate | | 4.02 | .53 | -.61 | 1.29 | 4.02 | .55 | -.69 | 1.55 | 4.03 | .49 | -.38 | .41 |

N=591

Note M stand for Mean, SD stands for Standard Deviation, Sk stands for Skewness, and Kurt for Kurtosis

3.3.2 Bivariate Correlations

Simple bivariate correlations for the whole sample were computed (see Table 3) to assess the degree and the direction of the relationship between the subscales of CART-Q/self-perceptions, CART-Q/meta-perceptions and the subscales of the PMCSQ-2. Pearson correlation coefficients among the subscales of the CART-Q self- and meta-perceptions ranged between a low of .57 to a high of .87. Statistically significant Pearson correlation coefficients among the subscales of the PMCSQ-2 and the subscales of the CART-Q/self-perceptions and CART-Q/meta-perceptions ranged between a low of -.15 to a high of .49 and were moderate. The intra-team member rivalry scale of the PMCSQ-2 did not correlate at all with the subscales of the CART-Q/self-perceptions and CART-Q/meta-perceptions. Overall bivariate correlations indicated that there was a moderate positive relationship between Closeness, Commitment and Complementarity, in both self- and meta-perceptions and the three subscales of task-involving motivational climate, with Pearson correlations

coefficients ranging from .33 to .49. Low to moderate negative correlations were found between the subscales of CART-Q self-and meta-perceptions and the ego-involving subscales. Punishment did not correlate with self-commitment, meta-closeness and meta-commitment.

Further, bivariate correlations for male and female athletes (see Table 5) showed similar patterns in the associations between athletes' perceptions of the motivational climate and the coach-athlete relationship. All CART-Q subscales were positively correlated with task-involving climate subscales, and negatively correlated with ego-involving subscales. In particular, the ego-involving climate subscale of punishment for mistakes was negatively correlated with all the CART-Q subscales but did not correlate with the task-involving subscales of cooperative learning and effort/improvement in the male sample. In the female sample punishment for mistakes did not correlate with self- and meta-perceptions of commitment and meta-perceptions of closeness. The ego-involving climate subscale of intra-team member rivalry scale exhibited a similar pattern in the two samples, of not correlating with any of the CART-Q subscales or the task-involving climate subscales with the exemption of the female sample in which a negative correlation was found between the intra-team rivalry subscale and the important role subscale.

Table 3: Bivariate Correlations among the CART-Q and PMCSQ-2 subscales for the whole sample

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------------|---|--------|--------|--------|--------|--------|---------|---------|--------|---------|---------|---------|
| 1. Self-Commitment | 1 | .75*** | .72*** | .66*** | .74*** | .63*** | -.06 | -.19*** | .04 | .42*** | .39*** | .47*** |
| 2. Self-Closeness | | 1 | .85*** | .68*** | .57*** | .66*** | -.15*** | -.22*** | .01 | .42*** | .44*** | .49*** |
| 3. Self-Complementarity | | | 1 | .71*** | .58*** | .75*** | -.16*** | -.17*** | .04 | .39*** | .41*** | .46*** |
| 4. Meta-Closeness | | | | 1 | .77*** | .87*** | -.12 | -.20*** | .02 | .41*** | .42*** | .41*** |
| 5. Meta-Commitment | | | | | 1 | .72*** | -.06 | -.17*** | .03 | .38*** | .33*** | .36*** |
| 6. Meta-Complementarity | | | | | | 1 | -.16*** | -.18*** | .03 | .41*** | .41*** | .43*** |
| 7. Punishment For Mistakes | | | | | | | 1 | .64*** | .47*** | -.20*** | -.08* | -.14*** |
| 8. Unequal Recognition | | | | | | | | 1 | .52*** | -.40*** | -.22*** | -.26*** |
| 9. Intra-Team Rivalry | | | | | | | | | 1 | -.10* | .05 | -.02 |
| 10. Important Role | | | | | | | | | | 1 | .63*** | .65*** |
| 11. Cooperative Learning | | | | | | | | | | | 1 | .71*** |
| 12. Effort/Improvement | | | | | | | | | | | | 1 |

N=591

*** Correlation is significant at the 0.001 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4: Bivariate Correlations among the CART-Q and PMCSQ-2 subscales for male and female athletes

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------------------|---------|--------|--------|--------|--------|--------|---------|---------|--------|---------|---------|---------|
| 1. Self-Commitment | 1 | .80*** | .76*** | .68*** | .72*** | .65*** | -.13** | -.24*** | -.02 | .42*** | .40*** | .45*** |
| 2. Self-Closeness | .64*** | 1 | .85*** | .73*** | .60*** | .68*** | -.19*** | -.27*** | -.02 | .44*** | .45*** | .49*** |
| 3. Self-Complementarity | .59*** | .82*** | 1 | .74*** | .65*** | .77*** | -.21*** | -.21*** | .00 | .42*** | .44*** | .47*** |
| 4. Meta-Closeness | .61** | .55*** | .60*** | 1 | .78*** | .87*** | -.20*** | -.26*** | -.06 | .43*** | .43*** | .40*** |
| 5. Meta-Commitment | .76*** | .45*** | .39*** | .71*** | 1 | .76*** | -.17*** | -.22*** | -.05 | .40*** | .35*** | .36*** |
| 6. Meta-Complementarity | .57*** | .60*** | .67*** | .87*** | .62*** | 1 | -.22*** | -.22*** | -.03 | .43*** | .42*** | .42*** |
| 7. Punishment For Mistakes | -.13 | -.22** | -.23** | -.06 | .06 | -.15* | 1 | .62*** | .43*** | -.16*** | -.03 | -.09 |
| 8. Unequal Recognition | -.25*** | -.21** | -.19** | -.16* | -.16* | -.17* | .63*** | 1 | .49*** | -.38*** | -.20*** | -.22*** |
| 9. Intra-Team Rivalry | .00 | -.04 | .00 | .13 | .09 | .07 | .45*** | .51*** | 1 | -.07 | .08 | -.00 |
| 10. Important Role | .46*** | .37*** | .34*** | .37*** | .35*** | .36*** | -.35*** | -.47*** | -.20** | 1 | .63*** | .62*** |
| 11. Cooperative Learning | .43*** | .44*** | .40*** | .43*** | .35*** | .41*** | -.20** | -.27*** | -.03 | .66*** | 1 | .72*** |
| 12. Effort/Improvement | .51*** | .50*** | .43*** | .46*** | .36*** | .42*** | -.35*** | -.44*** | -.11 | .74*** | .72*** | 1 |

N= (Males=414, Females=177)

*** Correlation is significant at the 0.001 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

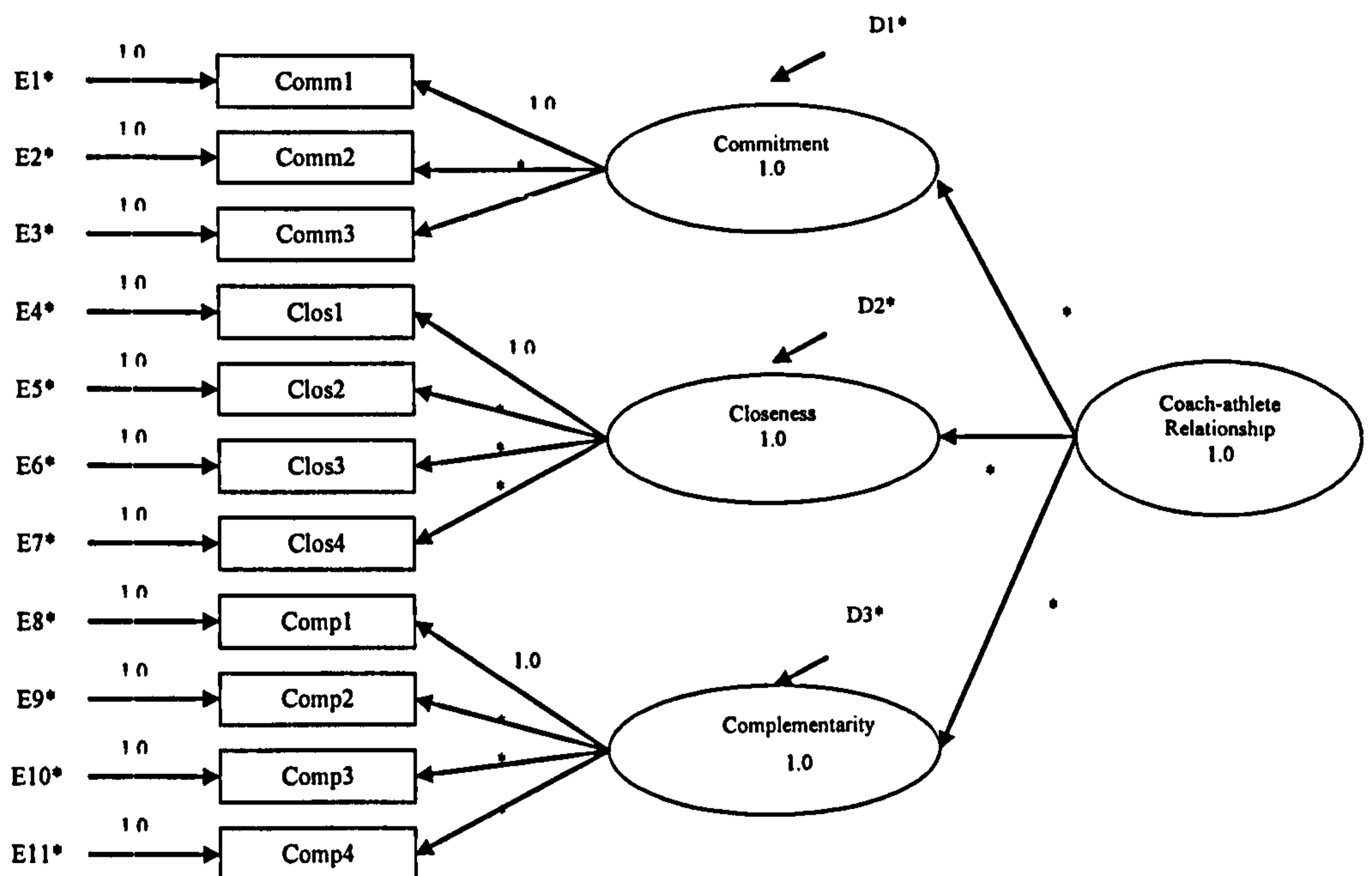
* Correlation is significant at the 0.05 level (2-tailed).

Note: The upper part of the correlation matrix presents the correlation coefficients for the male athletes and the lower part for the female athletes

3.3.3 Confirmatory factor analysis of the CART-Qs

Confirmatory Factor Analysis (CFA) was used to analyse the data. Both versions (self- and meta-perceptions) of the CART-Q have only been recently developed and validated. Previous validation studies (Jowett, 2002; Jowett & Ntoumanis, 2004) have generated and recommended a hierarchical second-order factor structure of the coach-athlete relationship. Thus, a hierarchical structure was tested in the present study using EQS 5.7b (Bentler, 1995). The sample size to free parameters ratio in the models examined, exceeded the recommended 10:1 ratio (Bentler, 1995). There were 25 free parameters in the model (8 first-order regression coefficients, 3 second-order regression coefficients, 11 measurements error variances, and 3 residual disturbances). A pictorial representation of the hypothesised model with asterisks representing the free parameters is illustrated in Figure 3. The sample size in the present study was 591, thus producing a ratio of 23.64 participants per parameter. Additionally, the model is overidentified, as there are 25 free parameters to be estimated and there are 66 data points or pieces of known information, yielding 41 degrees of freedom (Byrne, 1994).

Figure 3: Hypothesised second-order CFA Model for the CART-Q with EQS notation.



The assumptions of multivariate normality and linearity were examined through EQS. The normalized estimate of Mardia's coefficient was examined in each case to test for

multivariate normality. Mardia's coefficient is a z score thus, 1.96 is a common criterion for cut-of point. The normalized estimate of Mardia's coefficient was relatively high (56.89), indicating a degree of multivariate non-normality, and therefore, the robust Maximum Likelihood estimation procedure was utilised.

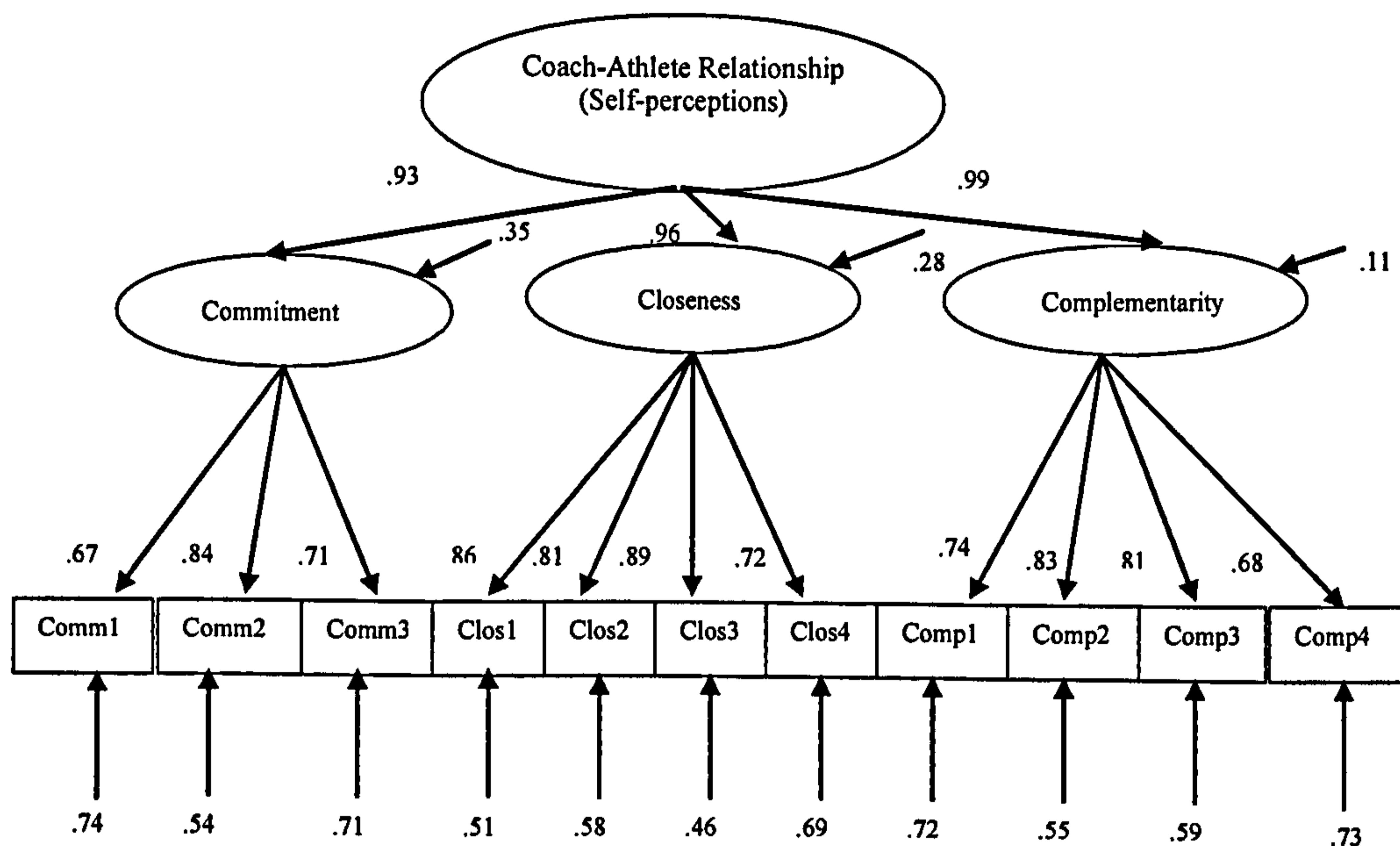
The fit indexes utilised to assess the capability of the model to fit the data adequately included the same indexes utilised in Jowett and Ntoumanis' (2004) study. The fit indexes included: Satorra-Bentler scaled χ^2 (S-B χ^2); robust Comparative Fit Index (CFI); Non-Normed Fit Index (NNFI); Standardised Root Mean Square Residual (SRMR); and the Root Mean Square Error of Approximation (RMSEA).

Although the χ^2 can reflect model fit relatively well in small samples sizes, nevertheless, it tends to be statistically significant and indicates poor fit with large samples. Large samples produce larger χ^2 and reject a model that should be accepted (Type I error). It is also affected by the size of the correlations in the model, the larger the correlations the poorer the fit. The NNFI is a relative fit index comparing the χ^2 for the model tested to the null model. In the NNFI fit index there is a penalty for adding parameters and lack of parsimony in the model. The CFI is a noncentrality-based index. A value of .90 to .95 for NNFI and CFI is considered as acceptable whereas over .95 excellent. RMSEA is also a noncentrality-based index and the estimation of what is best possible fit to the data is based on the degrees of freedom of the model. The SRMR is the average discrepancy between the observed and model-implied covariances. The smaller the discrepancy, the better the model fit. Values less than .08 indicate a good fit of the model to the data for RMSEA and SRMR, whereas a value of 0 indicates perfect fit (Hu & Bentler, 1999).

Results

Model Assessment. The hierarchical, second-order factor model in which the 3 Cs were contained for the self-perception version of the CART-Q fit the data in the current sample well; Sattora-Bentler $\chi^2 = 171.46$, $p < .001$, robust CFI=.93, NNFI = .92, SRMR = .04, RMSEA= .10 (.09, .12). Moreover, for the self-perception version of the CART-Q all factor loadings were high and ranging from .93 to .99 and were statistically significant (see Figure 4).

Figure 4: The higher-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (self-perception version of the CART-Q).

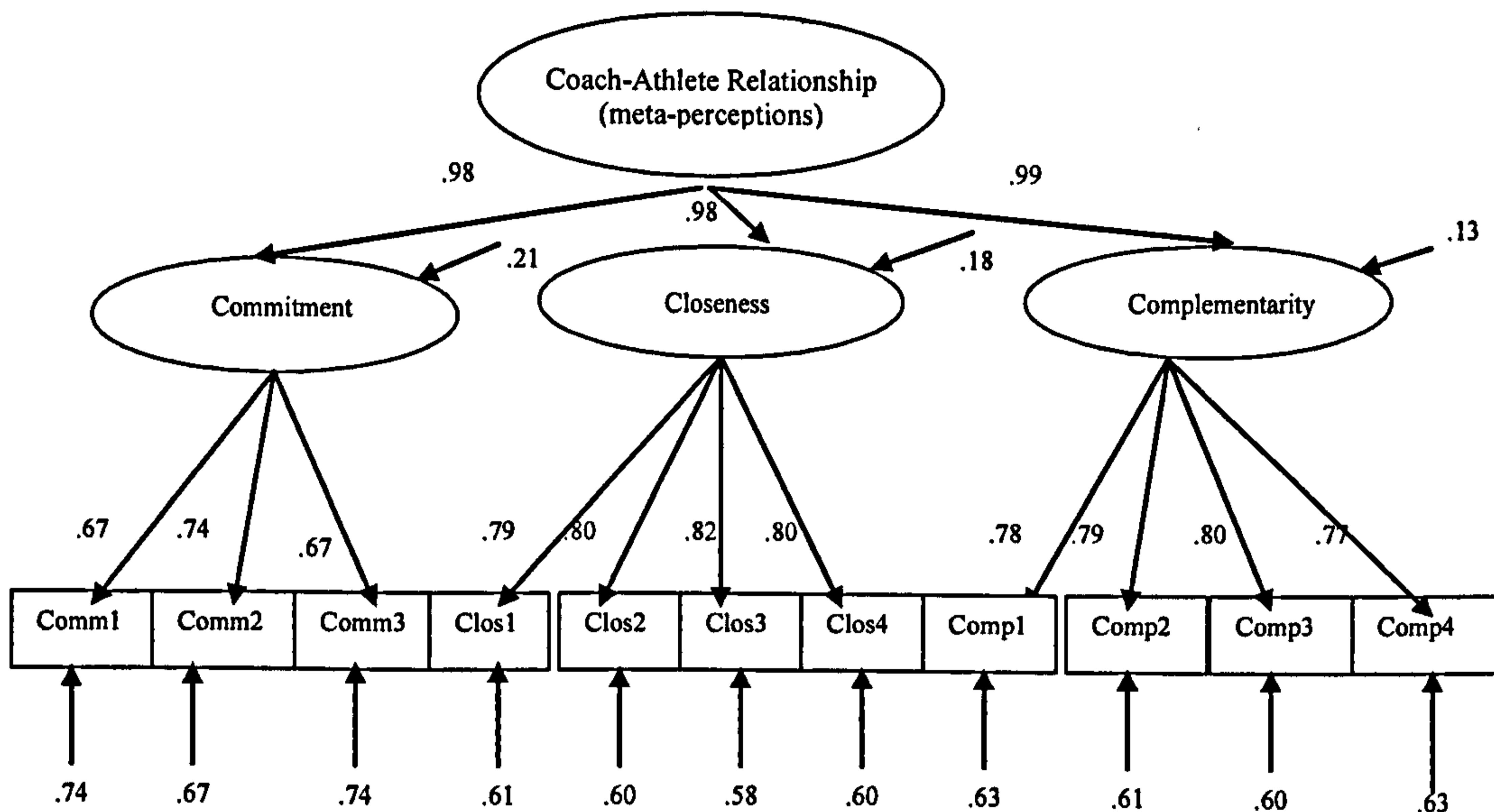


Note: All parameters are standardized and significant ($p < .001$).

The same model for the meta-perception version of the CART-Q, also generated good fit indices; Sattora-Bentler $\chi^2 = 153.61$, $p < .001$, robust CFI=.95, NNFI = .92, SRMR = .04, RMSEA= .10 (.09, .11).

Similarly, for the meta-perception version of the CART-Q all factor loadings were high, ranging from .98 to .99 and were statistically significant (see Figure 5). All items loaded as expected on their designated constructs. Factor loadings carry information on how well the higher order factor (i.e., the coach-athlete relationship) explains the variance in the three first-order factors (e.g., closeness). Thus, in both models the coach-athlete relationship factor explains a high proportion of the variance in the three constructs of closeness, commitment and complementarity.

Figure 5:The higher-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (meta-perception version of the CART-Q).



Note: All parameters are standardized and significant ($p < .001$).

Item loadings that are of substantial size and statistically significant, and that are able to account for a large proportion of variance in their latent factor are good indicators of the model's convergent validity. Item loadings refer to how well the observed measures represent the theoretical constructs (i.e., factors). In other words, convergent validity is the degree to which the observed variables of one construct (e.g., the items measuring the construct of closeness) empirically "converge" as indicators of the same construct. In both models of the self- and meta-perception version of the CART-Q examined in the present study, all factor loadings were statistically significant ($p < .001$) and moderately high in size (the average standardized loading was .78 for the self-perceptions version and .77 for the meta-perceptions version). That means the items of each construct both theoretically and empirically measure the same construct.

The squared multiple correlations (R^2) for each item and for both versions were also examined (see Table 5). Values of R^2 greater than .50 mean that half of an item's variance is explained by the construct on which it loads; if an item records a value less than .50 then this means that more than half of an item's variance is unique and thus unexplained by the construct it is designated to measure (Kline, 1998). Moreover, the average proportion of variance was .68 for the self-closeness factor, .55 for the self-

commitment factor, .59 for the self-complementarity factor, .64 for the meta-closeness factor, .48 for the meta-commitment factor, and .61 for the meta-complementarity factor.

A closer inspection of the items' R^2 showed that self- and meta-perceptions items recorded values $\geq .50$ with the exception of four items that recorded a value of .45 each ("I feel close to my coach", "When I am coached by my coach, I adopt a friendly stance", "My coach feels close to me", and "My coach believes that my sport career is promising with him/her"). For the self-perceptions version although two of the items explained less than 50% of the variance in their factors, the model fit the data well; whereas, in the meta-perception version, two of the items of commitment reported values less than .50, thus failing to measure the factor adequately. The self-commitment item "I feel close to my coach", did not show any improvement, whereas the self-complementarity item of "When I am coached by my coach, I adopt a friendly stance" exhibited the R^2 value of .51 after the deletion of 15 cases that contributed to multivariate normality. Similarly, the deletion of 15 cases that contributed to the multivariate normality in the meta-perception version raised the two meta-commitment items' R^2 value (i.e., "My coach feels close to me", and "My coach believes that my sport career is promising with him/her") to .48 and .49, respectively. All of the items' R^2 value were very close and approached the recommended cut-off point .50, thus they were retained for further analysis.

Table 5: Squared Multiple Correlations (R²) for all items

| | R ² |
|---|---|
| CART-Q items (self-perception version) | |
| Closeness | 1. I like my coach. .74 |
| | 2. I trust my coach. .66 |
| | 3. I respect my coach. .79 |
| | 4. I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. .53 |
| Commitment | 1. I feel close to my coach. .45 |
| | 2. I feel committed to my coach. .70 |
| | 3. I feel that my sport career is promising with my coach. .50 |
| Complementarity | 1. When I am coached by my coach, I am at ease. .55 |
| | 2. When I am coached by my coach, I feel responsive to his/her efforts. .69 |
| | 3. When I am coached by my coach, I am ready to do my best. .66 |
| | 4. When I am coached by my coach, I adopt a friendly stance. .46 |
| CART-Q items (meta-perception version) | |
| Closeness | 1. My coach likes me. .62 |
| | 2. My coach trusts me. .64 |
| | 3. My coach respects me. .66 |
| | 4. My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. .64 |
| Commitment | 1. My coach feels close to me. .45 |
| | 2. My coach is committed to me. .55 |
| | 3. My coach believes that my sport career is promising with him/her. .44 |
| Complementarity | 1. My coach believes that when I am coached by him/her, I am at ease. .60 |
| | 2. My coach believes that when I am coached by him/her, I am responsive to his/her efforts. .63 |
| | 3. My coach believes that when I am coached by him/her, I am ready to do my best. .63 |
| | 4. My coach believes that when I am coached by him/her, I adopt a friendly stance. .60 |

N=591

3.3.4 Gender Differences

Three separate one-way MANOVAs were conducted in order to test for gender differences (i.e., the manner to which male and female athletes perceive the motivational climate and the coach-athlete relationship). Significant multivariate main effect of gender emerged for the coach-athlete relationship as viewed by athletes' self-perceptions, Wilk's $\Lambda = 0.94$, $F(3, 587) = 12.19$, $p < .01$, $\eta^2 = .059$, observed power=1.00, and as viewed by athletes' meta-perceptions, Wilk's $\Lambda = 0.97$, $F(3, 587) = 6.04$, $p < .01$, $\eta^2 = .030$, observed power=.959. Partial eta squared for self-perceptions of closeness was $\eta^2 = .021$, observed power=.944, for self-perceptions of commitment was $\eta^2 = .055$, observed power=1.00, and for self-perceptions of complementarity was $\eta^2 = .027$, observed power=.981. Partial eta squared for meta-perceptions of closeness was $\eta^2 = .017$, observed power=.891, for meta-perceptions of commitment was $\eta^2 = .030$, observed power=.989, and for meta-perceptions of complementarity was $\eta^2 = .017$, observed power=.891. A significant main effect was also observed for athletes' perceptions of the motivational climate, Wilk's $\Lambda = 0.91$, $F(5, 584) = 11.49$, $p < .01$, $\eta^2 = .090$, observed power=1.00. Partial eta squared for perceptions of cooperative learning was $\eta^2 = .001$, observed power=.146, for effort/improvement was $\eta^2 = .002$, observed power=.202, and for important role was $\eta^2 = .000$, observed power=.053, for meta-punishment for mistakes was $\eta^2 = .068$, observed power=1.00, and for unequal recognition was $\eta^2 = .035$, observed power=.996. Overall, effect size as described by η^2 was low (i.e., under .10). The partial eta squared describes the proportion of the total variability that is attributable to an effect or a factor (i.e., gender). Effect sizes of .10, .30, and .50 can be interpreted as indicating small, medium, and large effects, respectively (Cohen, 1988). Thus, present results indicated that gender had an effect on participants' self- and meta-perceptions of the coach-athlete relationship and perceptions of the motivational climate, but the effects were less reliable and weak casting doubt as to their generalisation.

Follow-up univariate analysis of variance (ANOVA) indicated that males scored higher than females on the commitment [univariate $F(1, 589) = 34.13$, $p < .05$], closeness [univariate $F(1, 589) = 12.61$, $p < .05$] and complementarity self-perceptions subscales [univariate $F(1, 589) = 16.34$, $p < .05$]. Also males scored higher on the commitment [univariate $F(1, 589) = 18.06$, $p < .05$], closeness [univariate $F(1, 589) = 10.23$, $p < .05$] and complementarity meta-perceptions subscales [univariate $F(1, 589)$

=10.21, $p < .05$]. Differences in perceptions of the motivational climate were shown as a result of gender on the ego climate subscales of punishment for mistakes [univariate $F(1, 588) = 42.65, p < .05$] and unequal recognition [univariate $F(1, 588) = 21.04, p < .05$], where males scored higher than females in both subscales.

3.3.5 Canonical Correlation Analysis

In simple bivariate correlation analysis it is more difficult to discern patterns of associations across all of the variables and to understand the role of each variable when many are highly intercorrelated. Thus, canonical correlation analysis was conducted to systematically examine the degree of association between the concepts of the coach-athlete relationship and the motivational climates. Canonical correlation is an additional procedure for assessing the relationship between variables. Specifically, this analysis allows us to investigate the relationship between *two sets* of variables *simultaneously*. The variables in each set are used to create a composite measure. For example, the subscales of closeness, commitment and complementarity will form a composite measure of the coach-athlete relationship, whereas the variables of cooperative learning, effort/improvement, important role, unequal recognition, and punishment for mistakes will form the second measure of motivational climate. Thus, the two sets of multiple variables will form two *canonical variates*, which represent two linear combinations within a single set (of the dependent and independent variables). The canonical correlation coefficient (R_c) that is computed represents a measure of the strength of the relationship between these two canonical variates (Hair, Anderson, Tatham, & Black, 1998).

Unlike multivariate regression analysis that can handle only a single dependent variable, canonical correlation analysis facilitates the study of multiple independent and dependent variables. In the present study though, due to a lack of theoretical background, and any previous conducted research utilising achievement goal theory and the 3+1 Cs conceptualisation, assumption on the direction of prediction in the association between perceptions of the coach-athlete relationship and motivational climate cannot be formed. Therefore the assumption of which set of variables constitutes the dependent and independent variable was arbitrary. The aim of this study was more of a descriptive nature and the focus was shifted more towards the kind of relationship and its magnitude rather than prediction.

As mentioned earlier, canonical correlation reflects the linear relationship between the two canonical variates. In case the two canonical variates relate in any other non-linear fashion, this type of analysis will not be able to capture this non-linear relationship (Hair, Anderson, Tatham, & Black, 1998). The reason for this being, as Tabachnick and Fidell (1996) state, that "...the analysis is performed on correlation or variance-covariance matrices that reflect only linear relationships" (p. 198). In the present study, linearity was diagnosed from the inspection of bivariate scatterplots. Homoscedasticity and heteroscedasticity were also inspected through the scatterplots. Assumptions of multicollinearity and/or singularity were diagnosed by an inspection of the bivariate correlations. No variable exhibited a correlation of over .90 in order to suggest multicollinearity, and there was no perfect correlation of 1.00 to suggest singularity either. There were no missing values. According to Stevens' (1986) suggestions to arrive at reliable estimates of the canonical factor loadings, there should be at least 20 times as many cases as variables in the analysis, in order to interpret the first canonical root only. This criterion was met in the present study by utilising a sample comprising 591 athletes.

Four separate canonical analyses were conducted in total. In the first two, one for female athletes and one for the male athletes, the task- (Important Role, Co-operative Learning and Effort/Improvement) and ego-involving climate (Unequal Recognition and Punishment for Mistakes) subscales of the PMCSQ-2 comprised the dependent variable set and the subscales of CART-Q/self-perceptions (3Cs) perspective comprised the covariate set. In the second two, one for female athletes and one for the male athletes, the task- (Important Role, Co-operative Learning and Effort/Improvement) and ego-involving climate (Unequal Recognition and Punishment for Mistakes) subscales of the PMCSQ-2 comprised the dependent variable set and the subscales of the CART-Q/meta-perceptions (3Cs) perspective comprised the covariate set. Detailed results from these analyses are presented in Table 6.

The first step in interpreting the results is the examination of the canonical functions (canonical root) that the solution extracted. A canonical function is the degree to which the two pairs of linear composite variables associate. Only canonical functions that are statistically significant at the .05 level are interpreted. Along with the statistical significance, other criteria can be utilised for the interpretation of the

canonical function. These include the magnitude of the canonical correlation and the redundancy measure for the percentage of variance accounted for by the two sets of variables (Hair, Anderson, Tatham, & Black, 1998). Pairs that exhibit a canonical correlation less than .30 are disregarded, even if they are interpretable, because their squared canonical correlation will explain less than 10% of the overlap variance (Tabachnick & Fidell, 1996).

In canonical correlation, three assessments of variance are important (Tabachnick & Fidell, 1996). First, the squared canonical correlation represents the variance overlap, or amount of *explained variance*, or association between each significant set of canonical variate pairs (i.e., motivational climate and coach-athlete relationships). Second, the sum of squared correlations (loadings) on a variate divided by the number of variables in a set represents the variance extracted by the canonical variate from its own set of variables that is the *shared variance*. Thirdly, the index of redundancy describes the proportion of variance of the variables of one set that is accounted for by the linear combination of the other set and derives from the multiplication of the two previous components of variance ($R^2 * \text{shared variance}$).

Once the different amounts of variance are statistically significant and acceptable in magnitudes, the interpretation of the canonical function includes the report of the relative importance of each of the original variables in the canonical relationships. One of the methods proposed to interpret the canonical function is the examination of the canonical correlations (or canonical structure correlations, or canonical loadings, or canonical scores) that are simple correlations between the variables in each set and the canonical variates. The canonical correlations reflect the variance shared in the canonical variate shared by each variable. Variables that are highly correlated with a canonical variate have more in common with it. They can be compared to factor loadings when they are used to assess the relative contribution of each variable to each canonical function. A rule of thumb is to interpret variables with correlations of .30 and above, while variables with correlations below this cut-off point are disregarded (Pedhazur, 1982). This method of interpretation has been recommended over the alternative interpretation method through the inspection of canonical weights (Hair, Anderson, Tatham, & Black, 1998).

Table 6: Canonical Correlation detailed results for coach-athlete relationship (CART-Q self- and meta-perceptions) and motivational climate (PMCSQ-2).

| Variables | Males | | Females | |
|---|-----------------------|-------------------------|-----------------------|-------------------------|
| | CART-Q (self) & PMCSQ | CART-Q (meta) & PMCSQ-2 | CART-Q (self) & PMCSQ | CART-Q (meta) & PMCSQ-2 |
| Covariate Set | | | | |
| Closeness | -.97 | -.95 | -.89 | -.96 |
| Commitment | -.88 | -.84 | -.92 | -.88 |
| Complement | -.94 | -.97 | -.78 | -.84 |
| % of variance in the same set (shared variance) | 86% | 85% | 75% | 80% |
| Redundancy | 27% | 24% | 25% | 20% |
| R2 | 32% | 28% | 33% | 25% |
| Dependent Set | | | | |
| Punishment | .34 | .41 | .33 | .04 |
| Unequal Recognition | .46 | .47 | .45 | .33 |
| Important Role | -.82 | -.86 | -.81 | -.77 |
| Cooperative learn | -.83 | -.83 | -.84 | -.85 |
| Effort/Improvement | -.90 | -.81 | -.98 | -.90 |
| % of variance in the same set (shared variance) | 50% | 49% | 53% | 45% |
| Redundancy | 16% | 14% | 17% | 11% |
| | N=414 (Males) | | N=177 (Females) | |

Male athletes. One statistically significant canonical correlation function emerged for the self-perceptions of the coach-athlete relationship and motivational climate set, Wilks' $\Lambda = .65$, $F(15, 1118.43) = 12.44$, $p < .001$; canonical correlation was .56. The

amount of variance accounted for by the two pairs of canonical variates or else the overall variance (R^2) that the solution extracted from the canonical variates was 32%. In other words, the first pair of canonical variates accounted for 32% of the variance between the linear composites of the coach-athlete relationship and the motivational climate. For the coach-athlete relationship variables the first canonical variate accounted for 86% of the variance in that set. The redundancy was 27%. Moreover, the first canonical variate accounted for 50% of the variance in the subscales of task- and ego-involving climate while redundancy was 16%.

One statistically significant canonical correlation function emerged for the meta-perceptions of the coach-athlete relationship and motivational climate set, Wilks' $\Lambda = .70$, $F(15, 1118.43) = 10.40$, $p < .001$; canonical correlation was .53. The overall variance (R^2) that the solution extracted from the canonical variates was 28%. For the coach-athlete relationship variables the first canonical variate accounted for 85% of the variance in that set and redundancy was 24%. The first canonical variate accounted for 49% of the variance in the subscales of task- and ego-involving climate while redundancy was 14%.

Meeting the cut-off correlation of .30, the variables in the coach-athlete relationship set (Closeness, Commitment, and Complementarity in self- and meta-perceptions) were all correlated with the first canonical variate negatively. Among the motivational climate variables important role, cooperative learning, and effort/improvement were correlated with the first canonical variate negatively and unequal recognition and punishment for mistakes positively.

Female athletes. One statistically significant canonical correlation function emerged for the self-perceptions of the coach-athlete relationship and motivational climate set, Wilks' $\Lambda = .62$, $F(15, 466.94) = 5.90$, $p < .001$; canonical correlation was .57. The overall variance (R^2) that the solution extracted from the canonical variates was 33%. For the coach-athlete relationship variables the first canonical variate accounted for 75% of the variance in that set and redundancy was 25%. The first canonical variate accounted for 53% of the variance in the subscales of task- and ego-involving climate while redundancy was 17%.

One statistically significant canonical correlation function emerged for the meta-perceptions of the coach-athlete relationship and motivational climate set, Wilks' Λ

= .66, $F(15, 466.94) = 5.00, p < .001$; the canonical correlation was .50. The overall variance (R^2) that the solution extracted from the canonical variates was 25%. For the coach-athlete relationship variables the first canonical variate accounted for 80% of the variance in that set and redundancy was 20%. The first canonical variate accounted for 45% of the variance in the subscales of task- and ego-involving climate while redundancy was 11%.

The cut-off correlation of .30 was met and the variables in the coach-athlete relationship set (Closeness, Commitment, and Complementarity in self- and meta-perceptions) were all correlated with the first canonical variate negatively. Among the motivational climate variables important role, co-operative learning, and effort/improvement were correlated with the first canonical variate negatively and unequal recognition and punishment for mistakes positively. Only the PMCSQ-2 subscale of punishment for mistakes was not correlated with the CART-Q meta-perception subscales for the first canonical variate in the female group (see Table 6).

Summarising the results from the canonical correlation analysis, a similar pattern of results was detected in male and female athletes. In both groups, athletes who perceived an effective coach-athlete relationship, in terms of high self- and meta-perceptions of closeness, commitment and complementarity, perceived high levels of task-involving climate, in terms of high levels of effort/improvement, important role, and cooperative learning; athletes also perceived low levels of ego-involving climate, in terms of punishment for mistakes, and unequal recognition (with the exception of female athletes who perceived punishment for mistakes to be unrelated with meta-perceptions of closeness, commitment and complementarity).

3.4 Discussion

All three hypotheses of the first study have been identified, met, and confirmed. Particularly, the first hypothesis that concerned gender differences in how athletes perceive the two situational factors was established for athletes' perceptions of the motivational climate and provided some unexpected results for perceptions of the coach-athlete relationship. The second objective of the present study, namely the factorial structure of both versions of the CART-Q, was confirmed. The most important hypothesis of this study was to test whether variations in the coach-athlete relationship (as defined by closeness, commitment and complementarity) can be

viewed in terms of the task- and ego-involving characteristics. The next section discusses the results from the MANOVA, and CFA firstly, followed by the results from the canonical correlation analyses.

Pertaining to the first objective of the study, gender differences emerged in the present sample. Aligned with previous research that have shown males to hold more ego-involving perceptions than females of the motivational climate created by the coach, the present findings suggested that females perceived a more task- and less ego-involving climate, than did males (Kavussanu & Roberts, 1996; Li, Lee, & Solmon, 2003; White, Kavussanu, & Guest, 1998). The fact that females perceived a more task-involving perception of the environment created by the coach, suggests that the female athletes perceived their coach emphasising task mastery, gaining skill and knowledge, exerting maximal effort, and performing one's best. On the other hand, male athletes were shown to view that the coach created an environment where their evaluation of skill level differences was made public, the feedback was more based on normative criteria thus favouring the highly able, and mistakes were indications of low ability, bad performance subsequently had to be punished. It might be that there is more pressure from the social environment towards males for producing good results, than is for females. Male athletes have been shown to be higher in ego-involvement (Walling & Duda, 1995). Especially, for male dominated sports, such as football and rugby, a view has been established comparing the sport culture to a military regime, wherein discipline and punishment are acceptable techniques and it might be that male athletes are more competition-oriented and win-oriented than females (Gill, 1992). Boys have been shown to be more competitive, whereas girls tended to interact in a cooperative and caring manner, when learning fundamental motor skills (Garcia, 1994). Furthermore, teachers' beliefs that boys could cope better and more effectively than girls with an ego-involving condition, partly because "girls were not as interested in competing as the boys and did not fare very well in that environment" (Solmon, 1996, p. 736) complement the aforementioned findings.

However, instead of focusing solely on gender differences the present results show that the two genders are not that different. They still both perceive high levels of task-involving climate and lower levels of ego-involving climate.

An intriguing finding though was that male athletes reported higher levels of closeness, commitment, and complementarity towards their coach than females, perceiving that

their coach was holding similar views about them. The gender differences uncovered in this study could be attributed to a number of reasons. Firstly, a methodological limitation regarding the sampling procedure, favoured male athletes in proportion compared to females (males= 414, females= 177), suggests that one may not place enough confidence on these results, and that future research should pay extra attention in the representation of male and female athletes in the sample, of each participation level, each sport, the amount of time the athletes have spent with their coach and their team. Although the present study sampled athletes from a variety of team sports, not all sports were equally represented from male and female athletes. It might be that in certain sports (e.g., football, rugby), the sport culture dictates the formulation of more close relationships and friendships among the teammates and the coach, through regular meetings, and socialising. More frequent meetings and participation in common activities encourage closer bonds and relationships between the coach and the athletes. Also the amount of time that the athletes spent training (males reported more training hours than females) helps in a more frequent interaction with the coach, and thus the development of a closer relationship.

Another possible explanation for the closer and more effective relationships identified among the male players and their coaches compared to the female players and their coaches could be due to the deficiency of female coaches in coaching professions and the preferences of college-aged female athletes to identify more with female coaches. In the present study, although the gender of the coach was not taken into consideration, the majority of the coaches were male (from personal observations of the researcher). Past research has indicated that many reasons contribute to the existence of few female coaches (Chelladurai, Kuga, & O'Bryant, 1999). Athletes' preference for a male coach (Parkhouse & Williams, 1986), lack of support systems for women, burnout, long hours demanded of coaching that interfere with family obligations (Acosta & Carpenter, 1988, cited in Challadurai, Kuga, O'Bryant, 1999) are some indicative, external and internal to the individual reasons for the decline of women coaches. As though there are not many female coaches, and given the men's increasing tendency to coach women's teams (True, 1983), female athletes are coached in their majority by male coaches. It was reported in past studies that female athletes in high school tend to select male coaches as role models, when they enter college they shift their preferences to female coaches to serve as role models (Lovet &

Lowry, 1991). Other studies point to the importance of athletes' preferences for same-sex coaches; both male and female athletes have been reported to rating same-sex coaches higher in ability to motivate them, and in anticipating future success with them (Medwechuk & Crossman, 1994). Even more in a study with coaches coaching female athletes revealed that the athletes and the coaches maintained a distance from each other, so they would not be too close to each other, but they would still trust each other (Seiler, Kevesligeti, & Valley, 1999).

The present results are also contradictory to the common and traditional beliefs and expectations that women are higher in dependency needs than males. Thus gender differences can not be discussed without first identifying the structure, values promoted within this society, as they change from time to time and from country to country. Socialisation processes and agents should be identified and studied cross-culturally and across time. Although there is very little research on how male and female athletes perceive the coach-athlete relationship in terms of the 3+1 Cs, it has been documented in earlier studies that a more supportive coach was preferred by male athletes than female athletes (Chelladurai & Saleh, 1978; Terry, 1984).

Conclusively, one may not completely rely on the present results, as they might be sample specific, and given the fact that no other studies have investigated perceptions of the coach-athlete relationship in terms of the 3+1 Cs with solely team sport athletes. Further research is needed to shed more light in the way the two genders perceive their relationship with their coach.

The second purpose of the present study was to provide further evidence of the factorial structure of the self- and meta-perceptions version of the CART-Q utilising a sample of British team sport performers. Recently, the factorial structure of the self-perception version of the CART-Q was examined via CFA and results indicated that its structure corresponds to either a first-order three-factor model or to a higher-order model in which the 3 Cs are contained (Jowett & Ntoumanis, 2004). Jowett and Ntoumanis recommended that the higher-order factor containing the three properties of the coach-athlete relationship is preferable because such a model is more parsimonious. On the other hand, the factorial structure of the meta-perception version of the CART-Q has only been assessed via exploratory factor methods attesting to a three-component structure reflecting the 3Cs (Jowett, 2002). In the present study, the suggested hierarchical model was tested for both versions of the CART-Q, within a

team sport context. The study has also provided further evidence of the factorial structure of the self- and meta-perceptions of the CART-Q utilising a sample of British team sport performers. The higher-order models in which the 3 Cs are contained were found to provide an adequate fit for the sample for both the self-perceptions version and meta-perceptions version of the CART-Q. The analyses indicated that the items included in the subscales of the CART-Q were internally consistent, valid, and convergent. The relatively low R^2 values detected in a total of three items maybe due to the large and rather heterogeneous sample employed (Ridgon, message to SEMNET, December 30, 2003). Because validation is an on-going process, further validation studies may be required.

The hierarchical model in which the 3 Cs were contained exhibited good fit to the data for both the self-perceptions version and meta-perceptions version of the CART-Q. Congruent with Jowett and Ntoumanis' (2004) results and consistent with the underlying theory (Jowett & Cockerill, 2002; Jowett & Meek, 2000a) it was shown that team sport performers perceived the coach-athlete relationship in terms of the three constructs of closeness, commitment and complementarity. Moreover, participants were selected in order to cover a wide range of developmental stages of the coach-athlete relationship, from very early in the establishment of the relationship (less than 6 months relationship with their coach) to a well established relationship (more than two years), from different levels of participation, a wide assortment of team sports, and a wide range of training hours and sporting experience. Despite the good fit of the proposed model to the data, some items explained less than 50% of the construct they were purported to measure. Taken together the results of the present study indicate that the CART-Q self- and meta-perception measures of the coach-athlete relationship are applicable to team sports.

Simple bivariate correlations for the whole sample showed that self- and meta-perceptions of closeness, commitment and complementarity were positively related to perceptions of cooperative learning, effort/improvement and important role. This finding was consistent with the hypothesis that an effective/strong coach-athlete relationship (i.e., high levels of closeness, commitment, and complementarity) would be associated with a task-involving climate. Players who felt emotionally closer to their coach, trusted, liked, respected and were more committed to the athletic relationship, perceived a more cooperative climate in their interaction with the coach

and perceived that there was more reciprocity in their feelings, cognitions and behaviours on the part of their coach, they were more prone to perceive that their coach promotes a learning climate and was fair towards all the players in the team in rewarding their efforts and encouraging them to help each other.

Perceptions of punishment for mistakes and unequal recognition were negatively associated with perceptions of closeness, commitment and complementarity whereas the intra-team member rivalry subscale did not correlate at all with any of them. Interestingly, punishment for mistakes did not correlate at all with self- and meta-perceptions of commitment. Further bivariate correlations for gender revealed different correlational patterns regarding the ego-involving subscale of punishment for mistakes in male and female athletes. In particular, results showed that for male athletes, punishment for mistakes was negatively associated with closeness, commitment and complementarity in both self- and meta-perceptions. It appears those male athletes who perceived that their coach created a more ego-involving climate emphasising results and a focus on being the best through any means they also perceived a more distant coach-athlete relationship, less cooperative, and less promising in terms of future continuation. Male athletes perceived the ego-involving climate less favourable for their relationship with their coach. In the female sample punishment for mistakes was not associated with self- and meta-perceptions of commitment and meta-perceptions of closeness.

Further results from the canonical correlation analysis revealed that a strong, interdependent, and effective coach-athlete relationship (in terms of high scores in closeness, commitment, and complementarity) was positively associated with a task-involving coaching climate. These findings along with the findings from the bivariate correlations were in line with the hypotheses mentioned at the beginning of the chapter and suggest that athletes who experience a co-operative learning environment wherein effort and improvement are rewarded and every athlete's role is recognised as important for the success of the team, perceive at the same time coach-athlete relationships that are characterised by high levels of closeness (trust and respect), commitment (a desire to continue the partnership), and complementarity (maintain co-operation). However, because athletes' perceptions of their relationship with their coach were found to be negatively related with the subscales of the ego-involving climate, these findings suggest that athletes, who experience punishment and

favouritism from the coach, might also experience a weaker or less interdependent coach-athlete relationship. Notably, perceptions of an ego-involving climate were less strongly associated with self- and meta-perceptions of the 3 Cs, compared to perceptions of a task-involving climate. The highest correlations that were identified were the ones to contribute the most to the multivariate relationship. For male athletes, the level of their own perceptions of closeness (.97), that is how much they themselves liked, trusted and respected their coaches was the most important determinant of their judgements of the relationship, followed by own perceptions of complementarity (.94), and commitment (.88). Additionally, for male athletes their perceptions of how much emphasis the coach placed on their personal improvement and on rewarding effort over outcomes was the most important component in judging the motivational climate in their teams (.90), followed by perceptions of cooperative learning (.83), and important role (.82), whereas perceptions of unequal recognition (.46) and punishment for mistakes (.34) contributed minimally compared to the other components. The findings of the present study were consistent across male and female athletes. Furthermore, these findings were consistent with recent literature reviews (Duda, 1993, 2001; Ntoumanis & Biddle, 1999) and with research (Balaguer et al., 2002) asserting that task climates are linked to positive and adaptive psychological responses and outcomes.

For male athletes, the same pattern of associations was observed between their meta-perceptions of the coach-athlete relationship and perceptions of the motivational climate. However, for female athletes, a dimension of the ego-involving climate, namely *punishment for mistakes* was not related to meta-perceptions of the coach-athlete relationship (see Table 6). This finding suggests that female athletes' meta-perceptions of the coach-athlete relationship (i.e., athlete's ratings relevant to how her coach views their coach-athlete relationship) are unaffected by coaches' punitive behaviour. For example, coaches who punish female athletes after a bad performance might still be perceived by the female athletes as caring coaches, who trust, like and respect their athletes, who are committed to the athletic relationship, and engage in complementary interactions in order to improve their performance and general psychosocial development. The same is with the case of a non-punitive coach. It is possible that athletes' view coaches' punitive behaviour as an integral part of coaching. Consequently, female athletes may believe that coaches would not consider their

punitive behaviour when it comes to make judgments related to the quality of relationships with their athletes.

Overall, results from the canonical correlation analysis indicated that both athletes' self- and meta-perceptions of the coach-athlete relationship were highly associated with perceptions of a task-involving motivational climate that was created by their coaches. In essence, it was shown that when there was an accepting and caring climate, a closer and positive coach-athlete relationship was more likely to be salient. Athletes perceiving that their coaches made explicit expectations, and provided certain cues and rewards favouring effort over outcome, perceived emotional and cognitive closeness with their coach, and believed in their coach's ability to care and develop their sport skills. At the same time the athletes perceived negatively the salience of an ego-involving climate. The impact of an ego-involving climate has repeatedly been considered unhealthy by some sport psychologists (Duda, 1993; Nicholls, 1989), whereas others have emphasised that an equilibrium between task- and ego-involving goals promoted by the coach produce better results, than an emphasis on task-involving climate (e.g., Harwood, 2002).

Treasure and Roberts (1998) highlighted that athletes perceiving a task-involving climate derived satisfaction from mastery experiences, and social approval provided by significant others; athletes perceiving an ego-oriented climate derived satisfaction from outperforming others. The authors continued by stating that athletes perceiving an ego-motivational climate are more at risk of withdrawing from sport, because in case of not succeeding their goals, satisfaction and motivation would suffer. Pensgaard and Roberts (2000) found that perceptions of an ego-involving motivational climate were viewed as a source of distress for the athletes. Overemphasising outcome criteria and the results of the competition by the coach can be particularly stressful for the athlete even at the elite level, in which athletes already recognise the competitive nature of the environment (Pensgaard & Roberts, 2002). The atmosphere in elite sports is such that the emphasis on winning overshadows many more ordinary concerns such as fun, social interaction with peers and healthy coach-athlete relationships (Krane, Greenleaf, & Snow, 1997). Still in another study, athletes perceived higher levels of enjoyment in groups that were high in task and high in ego-involving climate, as well as in groups that were high in task and low in ego-involving

motivational climate (Liukkonen, Telama, & Biddle, 1998). The differentiating factor seems to be the emphasis on high levels of task-promoted goal involvement.

In the present study, athletes representing all participation levels reported that certain aspects of the ego-involving motivational climate (i.e., punishment for mistakes and unequal recognition) were associated with a weaker, less close and complementary coach-athlete relationship, which is in agreement with previous postulations (Duda, 1993; Nicholls, 1989; Pensgaard & Roberts, 2002). The emphasis of normative criteria in an already highly comparative environment such as the context of sports seems not to be conducive with and discourage emotions of trust, like and respect in the coach-athlete relationship. Older athletes (over the age of 17 years) and from various competitive levels have already experienced the meaning of competition and normative success, and further emphasis on these criteria of success is redundant, and only accentuates the maladaptive outcomes. However, an emphasis on mastery and improvement offers another source of enjoyment and ability criteria.

The two sets of perceptions (self- and meta-) of the athletic relationship have provided an insight into the complex interpersonal dynamics between coaches and athletes. The present results from the correlational analyses showed that athletes' meta-perceptions of the coach-athlete relationship are equally important with the self-perceptions. Thus, how athletes perceive their own judgments of the athletic relationship with their coach should be considered along with their meta-perceptions of this relationship. Their perceptions of the coach's perceptions of their athletic relationship are equally important when athletes perceive the motivational climate in a team. From a conceptual perspective, it is suggested that the incorporation of the 3+1 Cs conceptualisation in the integrated model of coach-athlete interactions and motivation (Duda & Balaguer, 1999) is compelling. Its integration would permit the examination of further hypotheses of the associations between coach-athlete relationships and athletes' cognitive, affective and behavioural responses based on goal models of motivation.

It is important to acknowledge the limitations and propose recommendations for future research studies. From a conceptual perspective, a complete understanding of the coach-athlete relationship requires the examination of both a coach's and an athlete's self- and meta-perceptions (Jowett et al., in press). In the present study, only athletes' self- and meta- perceptions were investigated, which constitutes a limitation.

Future studies that investigate both a coach's and an athlete's self- and meta-perceptions would provide a more holistic picture of the effectiveness of the dyadic coach-athlete relationship and its motivational properties and processes. From a methodological perspective, it is also valuable to be able to evaluate coaches' own perceptions of the motivational climate they create. At present, an instrument that measures coaches' perceptions of motivational climates is not available. Future research should attempt to develop a coach version of the PMCSQ-2. From a statistical perspective, this study did not account for common variance shared by athletes who belonged in the same team; this is problematic. Thus, sophisticated statistical packages that deal with common variance in the data should be sought in future studies. Finally, a cross-sectional study like this one provides valuable information, but it does not enable us to infer causation. Thus, future research studies should target the coach-athlete relationship and the motivational climate across time, employing a longitudinal research design. Such a design would provide valuable information of possible causal links and patterns of change.

Due to the fact that these results are correlational in nature and provide no clear evidence as to the direction of causality between motivational climate and the coach athlete relationship, further research should investigate several lines of inquiry regarding this relationship. Specifically, it is possible based on the redundancy index to propose that the coach athlete relationship could better predict the motivational climate. In addition, research must determine the specific qualities of the task- and ego-involving motivational climates and the coach-athlete relationship across type of sport, age, and competitive level. Based on the present results one may contend that the way female team sport athletes perceive the motivational climate and the coach athlete relationship is similar to male team sport athletes' perceptions.

It is important that we continue to explore associations between situational goal orientations and the coach-athlete relationship alongside antecedent and consequent variables as proposed by the integrated model (Duda & Balaguer, 1999). The generated knowledge would provide invaluable information to coaches interested to create a team environment that is effective, harmonious and successful. In a team environment like this, athletes' would feel confident, and comfortable in expressing and fulfilling their needs, goals and aspirations.

Because the structure of the motivational climate by the coach basically reflects the coach's preferences and goal orientations, future studies should investigate the compatibility of coaches' and athletes' goal orientations and the perception of the motivational climate by both sides.

CHAPTER 4

STUDY 2

TRACING ATHLETES' PERCEPTIONS OF THE COACH- ATHLETE RELATIONSHIP AND THE MOTIVATIONAL CLIMATE OVER TIME

4 Study 2: Tracing Athletes' Perceptions of the Coach-Athlete Relationship and the Motivational Climate over Time

4.1 Introduction

Study 1 established a link between the dimensions of the perceived coach-created climate in the team and the perceived athletic relationship between the coach and the athlete with a cross-sectional design. However, motivational climates and the coach-athlete relationship are inherently dynamic systems; they are arguably constructs that develop and change over time. Jowett (2002) stated that there is continuous evolution of the relationships and that they are not static. Stafford (1994) argued that because relationships involve people who themselves change across their life spans so does their relationships. Nicholls (1989) has explicitly described the developmental course of achievement goals in children from the age of 7 up to adolescence. Nicholls and Miller (1984) argued that the development of the normative conceptions of ability first appear at about this age due to responsiveness to social influences. The findings of Butler (1989) in a study with children, where it was shown that 8-year old children reported reduced interest in task when the experimenter announced that he wanted to see which group would draw the best picture, are in accord with the previous suggestions. At the age of 10 children experience a major decline in their perceptions of ability due to their cognitive maturity. The differentiation though of the concepts of effort and ability culminates at the age of 12.

These cognitive and developmental differences have a great impact on children's intrinsic motivation and interest in sport and physical activity (Deci & Ryan, 1985; Roberts, 1992). As athletes begin to understand the meaning of competition in sport through the normative conception of ability, their intrinsic motivation is undermined by an emphasis on competition, occurring for example when the coach emphasises winning over doing one's best (Chaumeton & Duda, 1988). With age, athletes are more able to see the point of competition as do adults and in case they see themselves as incompetent it is more likely to find the competition unpleasant and withdraw. Especially, athletes' withdrawal of voluntary sport activities at the early adolescence might partially reflect the development of conception of ability as current-capacity,

but might reflect the influence of the perceived motivational climate emphasised in their team.

Once an athlete has reached the age of 12 and has developed the differentiated conception of ability, then his/her predispositions will be responsible for the adoption of one of the two conceptions of ability and the subsequent goal involvement. Although individual differences are shown to be the main factor of goal involvement, perceptions of the motivational climate operating in the schools and sport is an important cause of perceptions of ability and the subsequent motivation.

Thus far, no empirical evidence exists of the investigation of the stability and/or change of perceptions of the motivational climate and the coach-athlete relationship over time. A recent attempt to study longitudinally the situationally emphasised achievement goals in the sport domain was the study of Whitehead, Andrée and Lee (2004). Perceptions of goal orientations, motivational climate, ability and enjoyment were examined in 114 track-and-field athletes in the mid-season and one year later again in the mid-season period. Results showed that athletes who perceived an ego-involving motivational climate operating in their team and had low perceptions of ability were more likely to withdraw, lending evidence to the tenets of achievement goal theory. It was also revealed that task-oriented athletes who perceived an ego-involving climate were more likely to withdraw, referring to the 'person-environment fit' theory (Previn, 1968) that implies greater withdrawal in the case of mismatching between dispositional and situational perspectives.

Although Whitehead, et al. (2004) assert to have used a longitudinal design, the design was restricted in two time-point measures and logistic regression was used to predict the likelihood of persistence from the earlier measures. Although the study contributed the most to our knowledge on the influence of the climate on persistence, no information on the course of the climate over this period could be provided with only two time-point measures and the specific type of statistical analysis. Additionally, in this study, the measure of perceived motivational climate was modified and shortened so that only 7 items were retained for analysis, measuring only two of the six original PMCSQ-2 subscales.

A call from many researchers in the achievement goal theory context has been expressed with regards to developmental designs to delineate the pattern of

perceptions of the motivational climate in relation to other constructs over time: such as goal orientations (Newton, Duda, & Yin, 2000; Seifriz, Duda, & Chi, 1992; Williams, 1998) (Halliburton & Weiss, 2002) dispositional goals and achievement related beliefs such as sport-confidence (Magyar & Feltz, 2003), dispositional goals and perceived competence (Newton & Duda, 1999; Standage, Duda, & Ntoumanis, 2004), self-determined-motivation (Standage & Treasure, 2002) and studies that employ a longitudinal field experiment design in which the examination of the manipulated environment affects motivational processes and behaviour (Kavussanu & Roberts, 1996).

There are several reasons why it is important to better understand the stability or change in perceptions of the motivational climate and the coach-athlete relationship as perceived by athletes over time. In the case of non-stability of these perceptions, it is more likely that a longitudinal approach will identify the direction of change and the manner in which it changes. Athletes' perceptions of the coach-athlete relationship and the motivational climate might remain stable, increase/decrease over time in a linear fashion, or show inconsistent patterns of change thus, formulating a non-linear or curvilinear shape of change. The identification of the time periods within which these changes take place, will allow sport psychologists to locate the factors that contribute to these changes and design and apply their interventions on specific time periods thus, maximising their effectiveness.

It is also important to study the nature of the relation between these two constructs. Given the observed positive association between the coach-athlete relationship in terms of closeness, commitment and complementarity with the task climate and the negative association with the ego climate in the previous study, it is of interest to confirm this pattern of associations across a season. Are perceptions of a task motivational climate related to closeness, commitment and complementarity in the beginning, middle and end of a season? Are they changing and if they are, does one construct influences the rate of change in the other construct? Answers to these questions are of great importance as both constructs are considered situational and thus are leading prospects for manipulation in programs aimed at improving athlete's performance, well-being and motivation. If earlier athletes' perceptions of the coach-athlete relationship are predictive of later growth of motivational climate then the coach-athlete relationship is an important point to focus intervention efforts. However

if the direction of influence is reversed and athletes' perceptions of the motivational climate can predict later growth of the coach-athlete relationship then interventions on the coach-athlete relationship would be misplaced. Similarly, if the observed relation between perceptions of the motivational climate and the coach-athlete relationship was due to a third variable cause then attempting to manipulate any of them would be meaningless.

The significance in adopting a longitudinal method that permits the systematic study of stability and change over time and provides critically needed empirical evaluations of the course, causes and consequences of perceptions of the coach-athlete relationship and the motivational climate was highlighted and explained further. Therefore, in this study, it may be of interest to adopt a dynamic perspective and examine how these perceptions change over time and more specifically throughout an academic season and how these changes are influenced by time-invariant features in the system. In addition to examining the change in each of these constructs over time it may be of interest to examine how these two perceptions change together over time. Motivational climate and coach-athlete relationships are different facets of the social context in which the athletes and coaches operate. As the coach adopts new techniques and changes his behaviours to meet the demands of the situations (early versus late season, training versus competitive situations) the situational goals that are emphasised differ in every occasion.

Thus summarising, the present study was initiated and guided by the identification of specific gaps in the sport psychology literature. Firstly, no previous published studies have examined the association between perceptions of motivational climate and the coach-athlete relationship over time. Secondly, no previous studies have used latent growth modelling to predict an individual trajectory to explain the individual differences in growth. Thirdly, at a more micro-level, the present study contributes to the field of achievement goal theory in that the hierarchical structure (i.e., the higher order dimensions of Task- and Ego-involving Climate along with the sub-dimensions of Cooperative Learning, Effort/Improvement, Important Role, Punishment for

mistakes and Unequal Recognition¹) of the PMCSQ-2 was utilised. The majority of the literature has focused on the higher order dimensions, but the PMCSQ-2 was hierarchically constructed in order to distinguish the precise elements that constitute the two climates (Newton, Duda, & Yin, 2000). Therefore, the specific subscales of the PMCSQ-2 were the focus of and were explored in the present study. No published studies to my knowledge, have attempted to explore these specific facets of the climates in the passage of time and more specifically during an academic season.

4.1.1 Specific Research Questions

There were three main objectives to this study. The first objective was the identification of a pattern of change in the elements of the coach-athlete relationship and motivational climate. This is the most important part of the study as the justification of the following two objectives is based on the results of the first part. The results of the first step will determine which specific elements of the coach-athlete relationship and motivational climate will be examined next. Secondly, once a linear pattern has been identified in the specific components of the coach-athlete relationship and the motivational climate predictors of change will be included to explain the individual differences in the findings. Thirdly, the elements of the coach-athlete relationship that showed a significant linear pattern in the rate of change will be examined along with specific elements of the motivational climate in order to detect multivariate effects and predictions. Therefore, the second study followed three steps in the statistical analysis to address the following specific research questions:

STEP 1

1a) Is there evidence for systematic change and individual variability in change in athletes' perceptions of the coach-athlete relationship over time (*Q1a*)?

¹ The Intra-team Member Rivalry subscale was excluded from the present study due to its low reliability scores.

1b) Is there evidence for systematic change in athletes' perceptions of the coach-created motivational climate over time (*Q1b*)?

STEP 2

2a) Are there gender differences in the initial levels or rates of change of athletes' perceptions of the coach-athlete relationship and/or motivational climate (*Q2a*)?

2b) Do athletes that have experienced longer relationships with their coach have higher initial levels and/or steeper rates of change in their perceptions of the coach-athlete relationship and motivational climate (*Q2b*)?

STEP 3

3a) Are the initial levels of athletes' perceptions of the coach-athlete relationship related to the initial levels of athletes' perceptions of the motivational climate (*Q3a*)?

3b) Are rates of change in athletes' perceptions of the coach-athlete relationship related to rates of change in athletes' perceptions of the motivational climate (*Q3b*)?

3c) Do earlier levels of athletes' perceptions of the coach-athlete relationship predict later change in athletes' perceptions of the motivational climate (*Q3c*)?

3d) Do earlier levels of athletes' perceptions of the motivational climate predict later change in athletes' perceptions of the coach-athlete relationship (*Q3d*)?

4.2 Methodology

4.2.1 Participants

The total sample consisted of 114 university athletes (74 male and 40 female athletes) aged 17 to 42 years (average age = 21.10 years, SD = 2.50). Participants were recruited from a variety of team sports: rugby (N=23, 20.2%), football (N=14, 12.3%), volleyball (N=17, 14.9%), basketball (N=28, 24.6%), rowing (N=10, 8.8%), ultimate Frisbee (N=2, 1.8%), American football (N=10, 8.8%), and netball (N=10, 8.8%). The duration of the relationship that the athletes had developed with their coach ranged from 1 month to 10 years (M= .06 years, SD=1.20). The time that the athletes have spent in training with their university team and their coach ranged from 2 to 20 hours per week (M=5.78, SD=3.31). The demographics mentioned were taken at the first measurement time point.

It should be noted here that the originally 430 athletes were approached and participated in the first time point. There was an attrition rate of 60% in the second time point (258 participants). In the third time point another 56% attrition rate reduced the sample to 114 participants. Thus, the completion rate was 26.5%.

A second issue to be addressed at this point is that 70 participants (61% of the final sample) participated in Study 3. Thus, the samples in Studies 2 and 3 are not completely independent. However, separate analyses will be conducted for each study, as another 39% was involved in study 2.

It would be very useful at this time point, to put the research in the frame of university context and especially Loughborough University, which is top ranked in England with regards to sport studies. Its top-quality sport facilities and reputation attract an extremely high standard of players. Its reputation relies upon achievement of the best results. Thus far, team sports have produced many important results and victories. For example, the 2003-4 was a record breaking season for Loughborough Students Association Football Club, with the Men and Women's 1st and Men's 2nd XI winning their BUSA Championships. In American football, Loughborough Aces had a regular season 7-1 and were Conference semi finalists in the season 2003-2004, whereas in 2001-2002 were College Bowl XVI Champions, Northern Conference Champions, and Central Division Champions. In Rugby union, the 1st team shared the inaugural National Student League title with Northumbria. In volleyball, the women's first team played in NVL Division One (4th in 2001/2) and BUSA Midlands Division One, whereas the Men's first team play in Prosport NVL Division Two (3rd in 2001/2 and 2002/3). In basketball, Loughborough Men's 1st team play in the BUSA premier North and EBL Division 3 South. In the 2003/04 season they finished top of the BUSA table (8-2) and 5th in the EBL Div 3 south.

Coaches of Loughborough university teams are selected according to their experience, how successful they have been generally in the past on their proven-track records. Most of them have received a high quality sports education. All of this information set a high competitive sport level environment in which end season results contribute to the continuation of the university's successful reputation.

4.2.2 Procedures

Ethical procedures in seeking approval from the university's ethical committee followed the same route as in Study 1. Upon receiving the committee's approval recruitment procedures involved sending a letter to the coaches of team sports at Loughborough University inviting them to participate in the study. In the letter the aim and purposes of the study were illuminated. Once the coaches gave their consent for their team to participate in the study the researcher met with the athletes at three equivalent spaced times during a nine-month academic sport season to distribute the questionnaires. The first time point was in the beginning of the academic season, in October, when the athletes were at their preparation period and they had not entered in any competition yet. The second time point was early January, in which the athletes had entered the competition period and were halfway through their matches. The third time point was three months later in April when athletes had almost completed their university competitive season. The athletes completed the questionnaires on their training grounds before their training session.

4.2.3 Instrumentation

A brief description of the questionnaires utilised in the present study is provided. For a more thorough and detailed description please refer to the study 1, methods section (pp. 76-80).

Coach-Athlete Relationship.

a) The Coach-Athlete Relationship Questionnaire/self-perceptions (CART-Q self-perceptions: Jowett & Ntoumanis, 2004) was used to assess athletes' levels of closeness, commitment and complementarity towards their coach from a direct perspective. Reliabilities of the subscales for the CART-Q/s at all three time points showed good internal consistency ranging from .81 to .90 for the subscales of Closeness (α = from .87 to .90), Commitment (α = from .81 to .86) and Complementarity (α = from .84 to .85) and from .92 to .94 for the composite score of CART-Q/s and all coefficients exceeded the .70 criterion level set forth by Nunnally (1978).

b) The Coach-Athlete Relationship Questionnaire/meta-perceptions (CART-Q meta-perceptions: Jowett, 2002) was used to assess athletes' meta-perceptions of the coach-

athlete relationship in terms of closeness, commitment and complementarity. Reliabilities of the subscales for the CART-Q/m at all time points showed good internal consistency ranging from .80 to .90 for the subscales of meta-Closeness (α = from .89 to .89), meta-Commitment (α = from .80 to .82) and meta-Complementarity (α = from .88 to .90) and from .94 to .95 for the composite score of CART-Q/m).

c) *Motivational Climate*. The Perceived Motivational Climate in Sports Questionnaire-2 (Newton, Duda, & Yin, 2000) was used to assess levels of athletes' perceptions of task- and ego-involving motivational climate. Intra-team rivalry subscale was excluded from further research and analysis because of the consistently reported low reliability scores at Study 1 of the present thesis, and previous studies (e.g., Gano-Overway & Ewing, 2004; Halliburton & Weiss, 2002; Newton et al. 2000; Treasure & Roberts, 1998). Reliabilities of the subscales for the PMCSQ-2 at all time points showed good internal consistency ranging from .70 to .91 for the first order factors of Cooperative Learning (α = from .82 to .83), Effort/Improvement (α = from .70 to .76), Important role (α = from .76 to .79), Punishment for mistakes (α = from .77 to .82), Unequal recognition (α = from .88 to .91), and from .89 to .90 for the second order factors of Task-involving Climate and Ego-involving Climate.

4.2.4 Data Analysis: Latent Growth Curve Modeling

It has been argued that the incorporation of repeated measures and longitudinal data into empirical research provides us with many advantages, and at the same time invites a host of new challenges, one of them being the selection of appropriate statistical method given that many options exist for analysing this type of data (Curran & Hussong, 2003). Taking it further, Curran and Bollen (2001) stated that

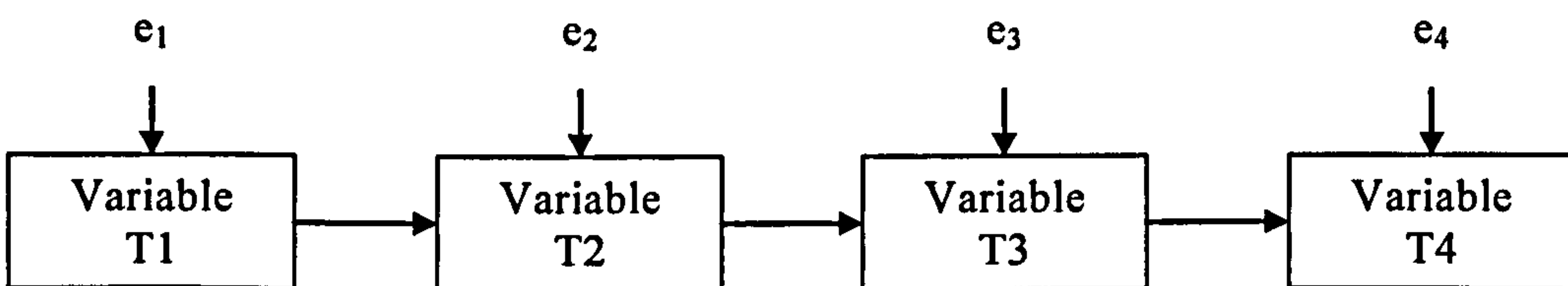
However, what has become increasingly apparent is that there is not necessarily a "right" or "wrong" approach to analysing repeated-measures data over time. The proper choice of a statistical model varies as a function of the theoretical question of interest, the characteristics of the empirical data, and the researcher's own philosophical beliefs about issues such as causation and change. (p. 107)

Latent growth modelling (LGM) was employed in the present study, to test for changes in athletes' perceptions of the coach-athlete relationship and the motivational climate. LGM is one of the two very popular statistical methods for analysing longitudinal data that have received significant attention especially in the social

sciences domain. The second one is the autoregressive model (AM), and both LGM and AM belong to the Structural Equation Modeling (SEM) family. AM have certain limitations, which LGM can overcome.

Bauer and Curran (2003) asserted that although random coefficient growth modelling (autoregressive modelling) has been eagerly adopted by many researchers due to its capability to provide a more dynamic analysis of repeated measures compared to traditional techniques (e.g., ANCOVA, MANCOVA) it is not suited for testing theories with distinct developmental pathways. Bollen and Curran (2004) explained that autoregressive models include variables that are an additive function of its immediately preceding value plus a random disturbance. Thus, the variable is regressed on itself at an earlier time period. Consequently, the autoregressive model gives priority to lagged influences and fixed effects. An autoregressive model can be seen in Figure 6.

Figure 6 :Autoregressive Model



Latent trajectory (or latent trajectory analysis, latent growth curve analysis, latent growth modeling) on the other hand, focuses on individual differences in trajectories over time. According to Duncan, Duncan, Biglan, and Ary (1998) LGM “provides a means of modelling a developmental function as a factor of repeated observations over time” (p. 60). Accordingly, Carrig, Wirth, and Curran (2004) argued that in latent trajectory analysis (or LGM) “a set of observed measures is used to estimate an unobserved, or latent, growth trajectory that is hypothesised to have given rise to the observed data” (p. 136). Instead of examining time-adjacent relations of a variable under study, the repeated measures of this variable are used to estimate a single underlying growth trajectory for each person across all time points. Thus, latent growth models do not consider the repeated measures of the construct to be “causes” of themselves in the sense that measure at time 1 causes measure at time 2, as in AM (Curran, Harford, & Muthén, 1996). In addition, LGM is more advantageous than repeated measures polynomial analysis of variance (ANOVA), which is said to be a

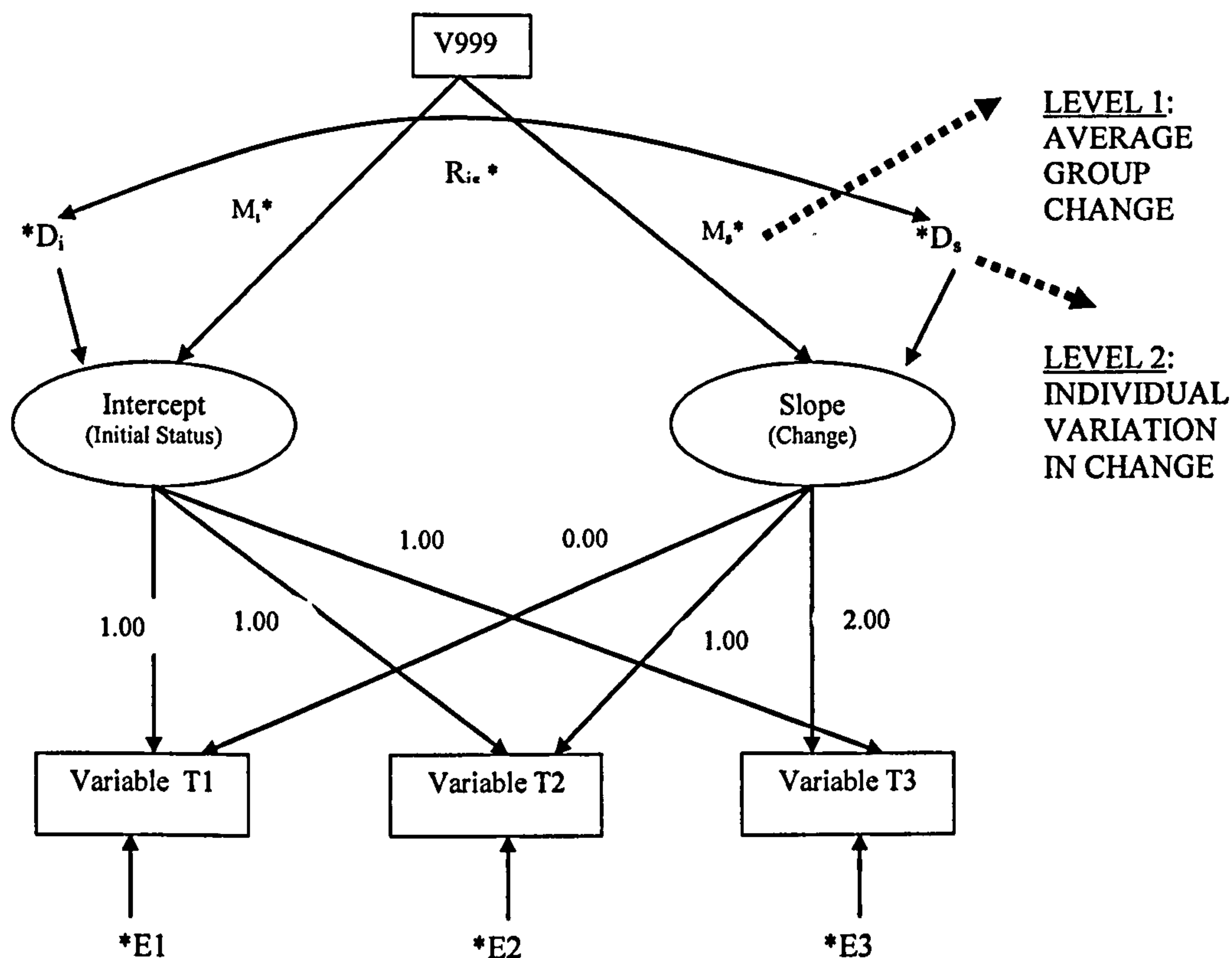
special case of latent growth modelling (Tisak & Meredith, 1990). Repeated measures ANOVA takes into account only the factor means, whereas LGM considers variances as well, in other words the former statistical technique considers only group level of analysis, whereas the latter combines uniquely the individual with the group level of analysis in to the procedure, thus describing group change and individual differences in change. Moreover, correlates of change (e.g., known characteristics of the individuals) can be incorporated to account for variations in change (Li, Duncan, McAuley, Harmer, & Smolkowski, 2000). For all the above characteristics, LGM has become an extremely useful tool for psychology researchers in analysing longitudinal data and change.

In order to better understand the main terms used in LGM, a brief introduction is deemed necessary. Three issues are of great importance in LGM. The first one is centred on the fashion with which the variable under investigation changes. Thus, a change can be linear (i.e., change in a straight direction), curvilinear, or simply non-linear. The second issue refers to the positive or negative values that the change might obtain. For example, a variable can increase or decrease in a linear fashion. The third issue deals with the level of analysis one chooses to focus upon. There are two levels of analysis. As it is important to understand the average change in a group but also the individual variation in change within the group, the first level refers to the average changes in a sample (i.e., mean trajectory scores), and the second one refers to the changes within an individual's trajectory. The second level of analysis constitutes the greatest strength of LGM. Intercepts and slopes are allowed to vary over individual; that is some individuals may report higher initial levels in a construct under investigation relative to other individuals and some individuals may report greater changes in the construct over time relative to the other individuals.

One of the main terms that is used in LGM is the intercept. It is best to conceptualise an intercept as the value at the start of the measurement process, and it is the standard from which change is measured. The intercept is central in helping to establish a baseline for the trajectory growth. The second term that is used in LGM is the slope. In simple words a slope provides information on how much the line (or curve) grows each time period. The intercept and the slope have two values each. The first value is their mean referring to the average value of the group as a whole. The second is an error term, the disturbance, which refers to the individual variability. Hess (2000)

described the mean or average of the intercept and slope factors as the “*between individual level*” and the variability around these means as the “*within individual level*” (p.420). Figure 7 shows in detail the univariate unconditional LMG model.

Figure 7: Latent Trajectory unconditional Model for single repeated measure



The mean intercept and the average slope, combined, will produce a line (or curve) that describes the average growth of the group. Unlike other longitudinal designs, LGM requires more than three observations so that the validity of the straight line growth model for the trajectory can be evaluated (Duncan, Duncan, Strycker, Fuzhong, & Alpert, 1999). Once a growth trajectory is fitted for each individual in the sample an average intercept and slope (i.e., fixed effects) as well as variability around these averages (i.e., random effects) can be computed (Curran & Bollen, 2001). Duncan et al. (1998) conceptualised LGM as comprising two stages. They argued that the first stage consists of a regression curve (linear, curvilinear, or non-linear) that is fitted to the repeated measures of each individual in the sample. The second stage includes a focus of the analysis on the parameters for an individual’s curve rather than the original measures. Thus, LGM not only describes a single individual’s developmental

trajectory, but also captures individual differences in these trajectories over time. Summarising, the within-individual stage, which includes the individual differences in terms of variability around the mean of the Intercept (D_i) and the mean of the slope (D_s), also called random effects, models aspects of intra-individual change. The between-individual stage, which includes the mean or average of the intercept (M_i) and the slope (M_s) also called fixed effects, models the sample mean change trajectory and within sample variability in change.

One of this research greatest strengths lies at the fact that described changes in athletes' perceptions of the motivational climate and the coach-athlete relationship, but described the inter- and intra-individual differences as well, regarding these perceptions. This informs a common distinction between nomothetic and idiographic approaches to research; where nomothetic approaches refer to the study and explanation of general laws governing the human behaviour, whereas idiographic approach focuses on the unique laws applied to each individual. From this perspective, an analogy can be drawn between nomothetic and idiographic tradition and LGM, in that the latter can provide general laws of change in a variable from the study of the mean scores of change, and unique laws resulting from the differences in individual variability.

A common procedure of testing growth trajectories is the creation of models that are "built upon in a hierarchy of increasing complexity" (Curran, Muthen, & Harford, 1998, p.649). To elaborate on this point, an unconditional model is tested first, that is a model in which only changes in one variable with no added factors explaining the change are tested. Second, this unconditional model can be extended to a conditional model including factors assumed to predict the change, such as gender, and age. These factors are introduced as predictors of individual differences in the initial status and/or change factor. Finally, two conditional or unconditional models can be combined together to test for simultaneous changes and correlations between their intercepts and slopes.

This procedure was followed in the present study in order to identify changes in the elements in the perceptions of the coach-athlete relationship and the motivational climate. In the first step of the analysis unconditional models were tested for each of the components of the coach-athlete relationship (i.e., Closeness, Commitment and Complementarity, in terms of self- and meta- perceptions) and the motivational

climate (i.e., Cooperative Learning, Effort/Improvement, Important Role, Unequal Recognition, and Punishment for Mistakes). In the second step, the unconditional models who revealed significant change in the variable under investigation were extended to include the factors of gender and time spent with one's coach as predictors of change. In the final step, models that revealed significant change over time were combined in pairs according to the findings of the first study to study the associations of the elements of the coach-athlete relationship in relation to the elements of the motivational climate across time. The models will be further explained and clarified in detail in each of the steps followed.

4.3 Results

4.3.1 Descriptive Statistics

Table 7 shows the mean, standard deviation, skewness, kurtosis, and alpha scores of all the variables used at the three time points. The athletes scored relatively higher in the three subscales of the CART-Q self-perceptions at the initial time point (i.e., above 4.5 on a 7-point scale, with 7 indicating a strong agreement with the statements), but the mean score for the subsequent time points showed a slight decrease. The same pattern was observed for the two of the subscales of CART-Q meta-perceptions, with the exception of the meta-commitment subscale in which athletes scored higher in the subsequent time points and the subscales of task climate with the exception of important role subscale. In contrast athletes scored lower in the ego climate subscales in the first time point, and higher in the subsequent time points. The skewness index ranged from -.99 to .18 for the first time point, -.04 to -.70 for the second time point and -.88 to .25 for the third time point. Kurtosis index ranged from -.88 to 1.57 for the first time point, -.59 to .59 for the second time point and -.86 to 1.15 for the third time point. The values of skewness and kurtosis did not exceed the cut off point of 2.00 (Chi & Duda, 1995) thus data were considered of indicating univariate normality.

Table 7: Descriptive Statistics of the CART-Q and PMCSQ-2 subscales for the second study

| | Time 1 | | | | | Time 2 | | | | | Time 3 | | | | |
|-------------------------|--------|------|----------|----------|----------|--------|------|----------|----------|----------|--------|------|----------|----------|----------|
| | Mean | SD | Skewness | Kurtosis | α | Mean | SD | Skewness | Kurtosis | α | Mean | SD | Skewness | Kurtosis | α |
| Self-Closeness | 5.57 | .95 | -.87 | .94 | .89 | 5.30 | 1.05 | -.70 | .59 | .87 | 5.16 | 1.14 | -.78 | .56 | .90 |
| Self-Commitment | 4.97 | 1.03 | -.99 | 1.57 | .82 | 4.82 | 1.01 | -.51 | .56 | .81 | 4.71 | 1.18 | -.42 | -.05 | .86 |
| Self-Complementarity | 5.52 | .85 | -.60 | .22 | .85 | 5.25 | .94 | -.49 | .35 | .84 | 5.17 | .97 | -.58 | 1.09 | .84 |
| CART-Q/s | 5.39 | .86 | -.90 | 1.05 | .92 | 5.15 | .92 | -.55 | .58 | .93 | 5.04 | 1.02 | -.61 | .50 | .94 |
| Meta-Closeness | 4.94 | .96 | -.53 | .52 | .89 | 4.91 | 1.02 | -.39 | .19 | .89 | 4.83 | 1.05 | -.69 | 1.13 | .89 |
| Meta-Commitment | 4.50 | .94 | -.57 | .49 | .81 | 4.52 | 1.05 | -.33 | .08 | .80 | 4.56 | 1.09 | -.88 | 1.10 | .82 |
| Meta-Complementarity | 5.05 | .87 | -.41 | .41 | .89 | 4.98 | .89 | -.16 | .15 | .88 | 4.82 | 1.06 | -.62 | .89 | .90 |
| CART-Q/m | 4.86 | .85 | -.46 | .20 | .95 | 4.83 | .92 | -.24 | .07 | .94 | 4.75 | .99 | -.71 | 1.15 | .94 |
| Cooperative Learning | 4.15 | .58 | -.58 | -.22 | .82 | 4.11 | .57 | -.30 | -.59 | .83 | 4.03 | .57 | -.15 | -.47 | .83 |
| Important Role | 3.91 | .70 | -.47 | -.47 | .79 | 3.93 | .71 | -.56 | .02 | .77 | 3.88 | .68 | -.19 | -.47 | .76 |
| Effort/ Improvement | 4.04 | .65 | -.45 | -.52 | .70 | 3.98 | .66 | -.60 | .20 | .76 | 3.94 | .60 | -.16 | -.43 | .75 |
| Task-Climate | 4.05 | .55 | -.39 | -.59 | .90 | 4.02 | .55 | -.39 | -.10 | .90 | 3.96 | .54 | .05 | -.86 | .90 |
| Punishment for Mistakes | 2.76 | .95 | .18 | -.78 | .81 | 2.85 | .79 | -.04 | -.35 | .77 | 2.86 | .90 | .25 | -.32 | .82 |
| Unequal Recognition | 2.95 | .95 | -.23 | -.88 | .91 | 2.97 | .85 | -.12 | -.45 | .88 | 3.12 | .85 | -.17 | -.25 | .89 |
| Ego Climate | 2.87 | .83 | -.12 | -.84 | .90 | 2.92 | .74 | -.14 | -.19 | .90 | 3.01 | .78 | .04 | -.09 | .89 |

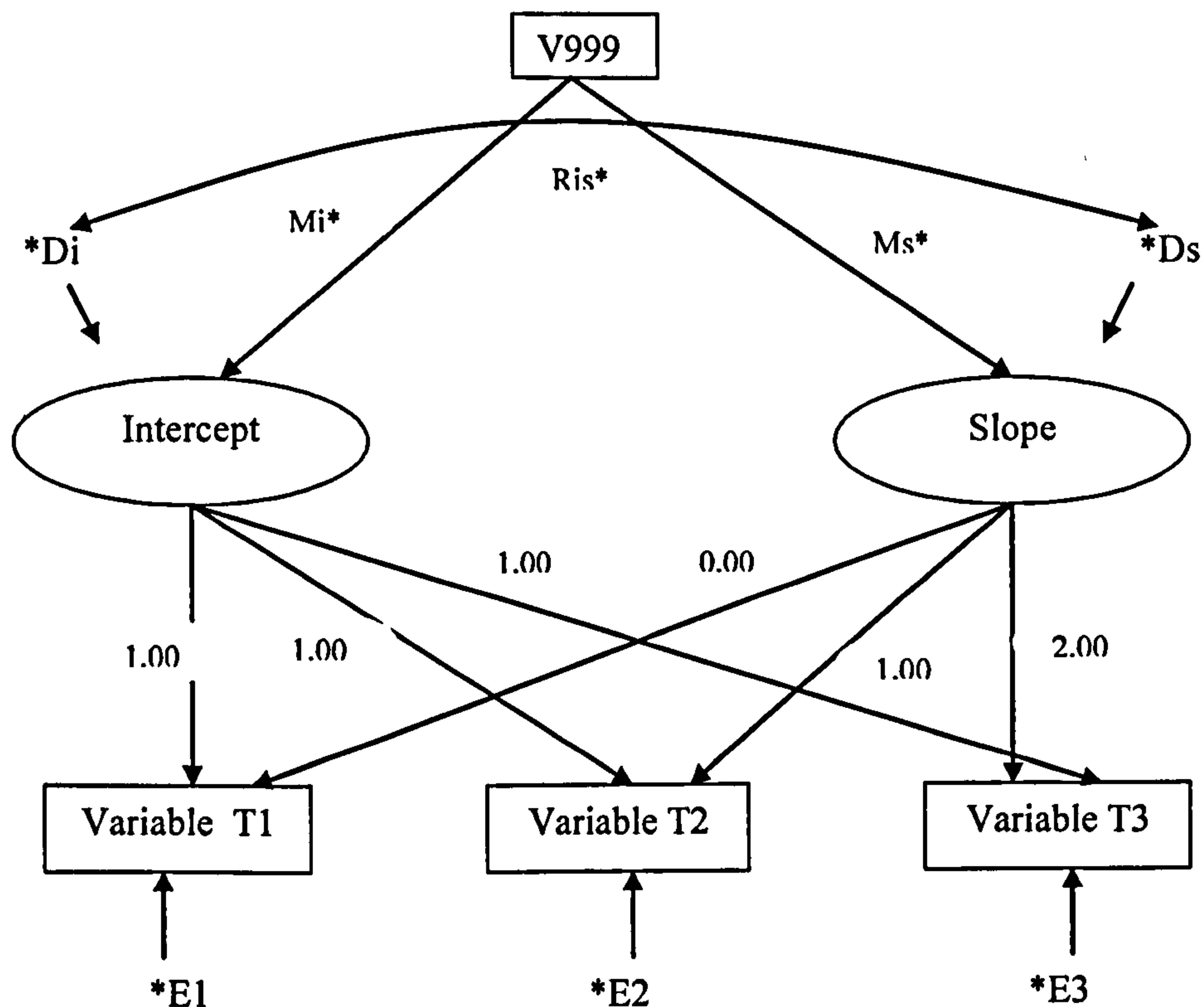
N= 114

First step in the LGM:

Research Questions Q1a and Q1b: Systematic change and individual variability in change in athletes' perceptions of the coach-athlete relationship and motivational climate over time

In the first step, a series of unconditional linear latent growth trajectory models were examined in order to test for inter- and intra-individual changes (i.e., fixed and random effects of growth) in the perceptions of the coach-athlete relationship and the motivational climate. The unconditional linear univariate model was used to provide initial insight into the first question relating to the characteristics of developmental trajectories in athletes' perceptions of the aforementioned variables. The specific elements of the coach-athlete relationship and the motivational climate were examined separately through different models. Specifically, three models were tested one for each of the three subscales of the CART-Q-self-perceptions, three models one for each of the three subscales of the CART-Q-meta-perceptions version and five models one for each of the subscales of PMCSQ-2. EQS 6.1 (Bentler, 2005) was used to estimate the unconditional models for the repeated measures of the variables under investigation that were collected at Times 1, 2, and 3. The model is illustrated in Figure 8.

Figure 8 : Univariate two-factor linear model of change

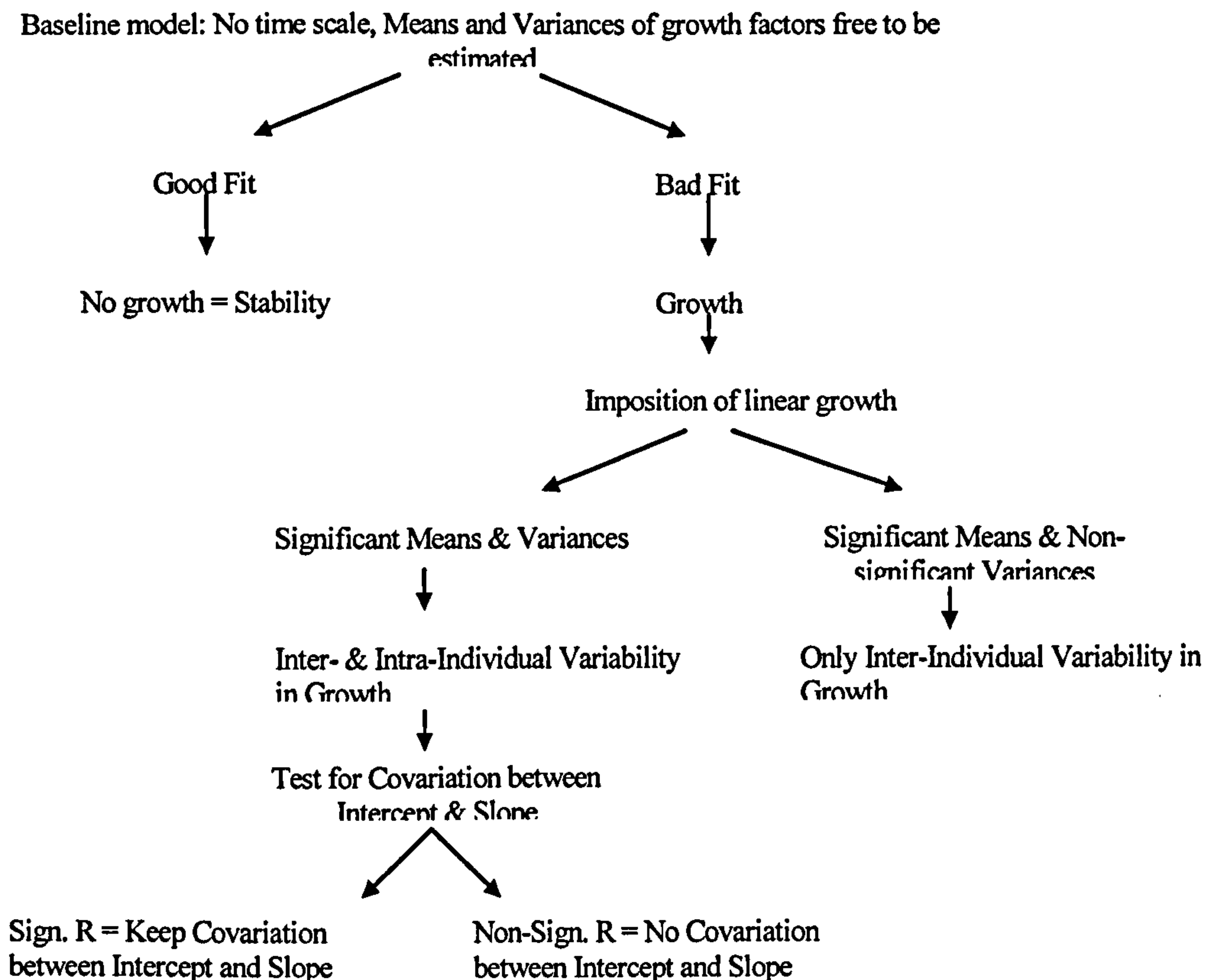


As mentioned earlier, LGM belongs to the SEM family. It invokes a confirmatory factor analytic structure of variables. The measures of the same construct that were obtained in multiple occasions of measurement represent the indicators. Two latent factors are imposed on these indicators and are estimated: the first factor defines the intercept of the developmental trajectory of the variable under investigation (e.g., Closeness, Commitment). Because the intercept describes the amount of the outcome variable possessed at the initial measurement point, all the factor loadings from the repeated measures of the variables to the intercept factor are fixed to 1.00. The second factor defines the slope of the trajectory. The slope captures information about how much an individual changes for each time interval after the initial measurement point (Hess, 2000). The factor loadings from the repeated measures to the factor slope are set to 0, 1, and 2 respectively to define a linear growth metric of time). The means of the intercept (M_i) and slope (M_s) factor are estimated. These values represent the model-implied mean developmental trajectory for all the athletes together (between-individuals level). The variance of the intercept (D_i) and the slope factor (D_s) were also estimated with these values representing the degree of individual variability in the

trajectories around the group mean values (within-individual level). The covariance between the intercept and the slope (R_{is}) represents the covariation between the variable's initial level and the rate with which it changes. Finally, residual variances were estimated for each repeated measure and they represented the variability in the time specific measures not accounted for by the underlying random trajectories. It was assumed that residual variances were uncorrelated.

Thus, the estimated parameters in a standard unconditional linear growth curve model are: the means of the latent trajectory factors (i.e., $M_{intercept}$ and M_{slope}), the variances of the latent trajectory factors (i.e., $D_{intercept}$ and D_{slope}), the covariance between the variances of the latent trajectory factors (i.e., $R_{intercept*slope}$) and the residual variance (E). Residual variances are estimated for each repeated measure and represent the variability in the time specific measures not accounted for by the underlying random trajectories (Carrig, Wirth, & Curran, 2004). It is assumed that measurement error remains constant over time and that residual variances are uncorrelated.

In the present research, because there was no theoretical and empirical evidence on the course of the coach-athlete relationship and motivational climate across an academic sporting season, the following procedure was followed (see Figure 9): A baseline model was tested in which all factor loadings were fixed at 1 to designate no growth over time, while mean and variances of the latent factors were free to be estimated and there was no specified covariation between the growth factors (Chassin, Curran, Hussong, & Colder, 1996). Once model fit proved to be not good through the examination of the fit indices, the factor loadings of the slope variable were set to 0, 1, and 2 respectively to represent a linear growth. Examination of the fit indices and the means and variances of the model defined the imposition or not of a covariation between the growth factors, such as when means and variances were statistically significant a covariation between the growth factors was imposed. When means of the slope factors were non-significant, covariation between the slope factors was meaningless. This increasing complexity in the structure of the model was deemed necessary due to no previous theoretical and empirical evidence on the stability/change of the coach-athlete relationship and the motivational climate over time. Only the final results will be reported due to space constraints. Thus the overall procedure can be summarised as follows:

Figure 9: Procedure for estimation of a Latent Curve Model

4.3.2 First Step in LGM. Research Questions Q1a and Q1b: Change and Stability in Perceptions of the Coach-Athlete Relationship and Motivational Climate

4.3.2.1 Results

4.3.2.2 Self-perceptions of the Coach-Athlete Relationship

1. Closeness. The baseline model did not fit the data well (χ^2 (2, N=114) = 19.744, $p < .05$, CFI = .91, RMSEA = .28 with 90 CI = .18 to .40). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well (χ^2 (2, N=114) = 1.02, $p > .05$, CFI = 1.00, RMSEA = .00 with 90 CI = .00 to .152). Together these various measures suggest a perfect fit of the model to the observed data. The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean closeness score of 5.55 at the first time period ($M_i = 5.546$, $t = 65.013$, $p < .05$) and a slightly but significantly decreasing slope of .20

units per time point during the study ($M_s = -.201$, $t = -3.557$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .387$, $t = 4.205$, $p < .05$) and the slope factor ($D_s = .112$, $t = 2.033$, $p < .05$) indicated significant individual variability in the initial level and the rate of change in perceptions of closeness. Thus, these values indicated that while the overall change was negative, not all individuals in the sample changed in the same rate and direction and not all of them started with the same value. The estimated correlation between the intercept and the slope was not significant² indicating that there was no association between closeness at Time 1 and the rate of change in closeness. Thus, it cannot be assumed that athletes, who scored higher (or lower) initially, will change more or less within each time interval. Because the correlation between intercept and slope was not significant it was removed.

2. Commitment. The baseline model did not fit the data well ($\chi^2 (2, N=114) = 7.774$, $p < .05$, CFI = .98, RMSEA = .16 with 90 CI = .05 to .284). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well ($\chi^2 (2, N=114) = .328$, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .103). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean commitment score of 4.96 at the first time period ($M_i = 4.964$, $t = 53.989$, $p < .05$) and a significantly decreasing slope of .13 units per time point during the study ($M_s = -.132$, $t = -2.302$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .499$, $t = 4.858$, $p < .05$) indicated significant individual variability in the initial level of commitment. Non-significant variance estimates for the slope factor ($D_s = .068$, $t = 1.306$, $p > .05$) indicated non-significant individual variability in the rate of change in commitment. Because no significant slope variance was found no estimated correlation was imposed on the model.

3. Complementarity. The baseline model did not fit the data well ($\chi^2 (2, N=114) = 24.703$, $p < .05$, CFI = .85, RMSEA = .32 with 90 CI = .21 to .432). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed

² The non-significant values of covariation between intercept and slope will not be reported.

data well (χ^2 (1, N=114) = 1.924, $p > .05$, CFI=1.00, RMSEA= .09 with 90CI = .00 to .284). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean complementarity score of 5.50 at the first time period ($M_i = 5.498$, $t = 69.574$, $p < .05$) and a significantly decreasing slope of .17 units per time point during the study ($M_s = -.171$, $t = -3.347$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .501$, $t = 3.714$, $p < .05$) and the slope factor ($D_s = .194$, $t = 2.962$, $p < .05$) indicated significant individual variability in the initial level and the rate of change in perceptions of complementarity. The estimated correlation was marginally significant ($R_{is} = -.194$, $t = -1.746$, $p < .10$) indicating that there is a marginal association between complementarity at Time 1 and the rate of change in complementarity.

4.3.2.3 Meta-perceptions of the Coach-Athlete Relationship

1. Meta-Closeness. The baseline model did not fit the data well (χ^2 (2, N=114) = 5.728, $p > .05$, CFI= .95, RMSEA= .13 with 90 CI = .00 to .256). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well (χ^2 (2, N=114) = .914, $p > .05$, CFI= 1.00, RMSEA= .00 with 90 CI = .00 to .148). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean meta-closeness score of 4.95 at the first time period ($M_i = 4.948$, $t = 57.757$, $p < .05$) and there was no change during the time period of the study ($M_s = -.058$, $t = -1.100$, $p > .05$). Further, significant variance estimates for the intercept factor ($D_i = .407$, $t = 4.507$, $p < .05$) indicated significant individual variability in the initial level of meta-closeness. Marginally significant variance estimates for the slope factor ($D_s = .085$, $t = 1.749$, $p < .10$) indicated marginally significant individual variability in the rate of change in meta-closeness but the variability was not powerful to show a significant mean change. Because there was no significant mean and variance slope no estimated correlation was imposed on the model.

2. Meta-Commitment. The baseline model did not fit the data well (χ^2 (2, N=114) = 8.077, $p < .05$, CFI= .86, RMSEA= .16 with 90 CI = .06 to .288). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well (χ^2 (2, N=114) = .827, $p > .05$, CFI= 1.00, RMSEA= .00 with 90CI = .00 to .143). The estimated means of the latent factors suggested that the model-implied

mean trajectory was characterised by a significant mean meta-commitment score of 4.50 at the first time period ($M_i = 4.498$, $t = 53.498$, $p < .05$) and there was no linear change during the time period of the study ($M_s = .032$, $t = .558$, $p > .05$). Further, significant variance estimates for the intercept factor ($D_i = .328$, $t = 3.719$, $p < .05$) indicated significant individual variability in the initial level of meta-commitment. Significant variance estimates for the slope factor ($D_s = .131$, $t = 2.344$, $p < .05$) indicated significant individual variability in the rate of change in meta-commitment, but it seems that the differences were not so strong to indicate an overall significant rate of change over time. Because there was no significant mean and variance slope no estimated correlation was imposed on the model.

3. *Meta-Complementarity.* The baseline model did not fit the data well (χ^2 (2, $N=114$) = 10.812, $p < .05$, CFI = .91, RMSEA = .20 with 90 CI = .09 to .318). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well (χ^2 (1, $N=114$) = 2.018, $p > .05$, CFI = .99, RMSEA = .01 with 90 CI = .00 to .186). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean meta-complementarity score of 5.07 at the first time period ($M_i = 5.067$, $t = 65.211$, $p < .05$) and a significantly decreasing slope of .12 units per time point during the study ($M_s = -.115$, $t = -2.210$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .302$, $t = 4.084$, $p < .05$) and the marginally significant variance estimate for the slope ($D_s = .080$, $t = 1.824$, $p > .10$) indicated significant individual variability in the initial level of meta-complementarity. Because the slope variance was marginally significant no correlation between the intercept and slope was imposed on the model.

4.3.2.4 Perceptions of the Motivational Climate

1. *Cooperative Learning.* The baseline model did not fit the data well (χ^2 (2, $N=114$) = 10.132, $p < .05$, CFI = .91, RMSEA = .21 with 90 CI = .09 to .337). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data well (χ^2 (2, $N=114$) = 2.715, $p < .05$, CFI = .99, RMSEA = .06 with 90 CI = .00 to .220). The significant mean for the intercept factor ($M_i = 4.220$, $t = 76.380$, $p < .05$) indicated that the overall group reported significant high initial levels of perceptions of cooperative learning. The significant negative mean for the slope factor ($M_s = -.087$, $t = -2.725$, $p < .05$) indicated that the overall group reported decreases in their

perceptions of cooperative learning over the three time points. Further, significant variance estimates for the intercept factor ($D_i = .124$, $t = 4.007$, $p < .05$) indicating substantial individual variability in the initial starting point. The slope factor ($D_s = .009$, $t = .574$, $p > .05$) indicated no significant individual variability in the rate of change in perceptions of cooperative learning. Because there was no significant variance estimate for the slope factor no correlation between the intercept and the slope was imposed on the model.

2. Important Role. The baseline model did not fit the data well ($\chi^2 (2, N=114) = 5.148$, $p > .05$, CFI = .97, RMSEA = .13 with 90 CI = .00 to .269). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data moderately well ($\chi^2 (2, N=114) = 1.018$, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .165). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean important role score of 3.99 at the first time period ($M_i = 3.994$, $t = 59.547$, $p < .05$) and a significantly decreasing slope of .12 units per time point during the study ($M_s = -.056$, $t = -1.509$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .204$, $t = 4.211$, $p < .05$) and the marginally significant variance estimate for the slope ($D_s = .032$, $t = 1.303$, $p > .05$) indicated significant individual variability in the initial level of important role. Because there were no significant slope mean and variance estimates no correlation between the intercept and slope was imposed on the model.

3. Effort / Improvement. The baseline model did not fit the data well ($\chi^2 (2, N=114) = 11.667$, $p < .05$, CFI = .97, RMSEA = .22 with 90 CI = .11 to .355). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data moderately well ($\chi^2 (2, N=114) = .406$, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .122). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant mean effort/improvement score of 4.12 at the first time period ($M_i = 4.116$, $t = 70.158$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.090$, $t = -3.006$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .186$, $t = 4.755$, $p < .05$) indicated significant individual variability in the initial level of effort/improvement. A non-significant variance for the slope factor emerged ($D_s = .025$, $t = 1.389$, $p > .05$), indicating that there is uniformity in each athlete's rate of change. Because no significant variance estimate for the slope

factor emerged, no correlation between the intercept and slope factor was imposed on the model.

4. Unequal Recognition. The baseline model did not fit the data very well (χ^2 (2, N=114) = 8.758, $p < .05$, CFI= 1.00, RMSEA= .19 with 90 CI = .07 to .321). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data moderately well (χ^2 (2, N=114) = .807, $p > .05$, CFI= 1.00, RMSEA= .00 with 90CI = .00 to .154). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant low mean unequal recognition score of 2.86 at the first time period ($M_i = 2.861$, $t = 31.788$, $p < .05$) and a significantly increasing slope of .12 units per time point during the study ($M_s = .122$, $t = 2.794$, $p < .05$). Further, significant variance estimates for the intercept factor ($D_i = .433$, $t = 4.951$, $p < .05$) indicated significant individual variability in the initial level of unequal recognition. A nonsignificant variance for the slope factor emerged ($D_s = .023$, $t = .668$, $p > .05$), indicating that there is uniformity in each athlete's rate of change. Due to the non-significant variance estimate for the slope factor correlation between the intercept and the slope was imposed.

5. Punishment for Mistakes. The baseline model did not fit the data well (χ^2 (2, N=114) = 4.067, $p < .05$, CFI= .98, RMSEA= .10 with 90 CI = .00 to .249). A two-factor LG model with specified linear growth was imposed on the data and it fit the observed data moderately well (χ^2 (2, N=114) = 2.547, $p > .05$, CFI= .978, RMSEA= .053 with 90CI = .00 to .216). The estimated means of the latent factors suggested that the model-implied mean trajectory was characterised by a significant low to moderate mean punishment for mistakes score of 2.75 at the first time period ($M_i = 2.753$, $t = 30.565$, $p < .05$) and a non-significantly increasing slope of .07 units per time point during the study ($M_s = .065$, $t = 1.232$, $p > .05$). Further, significant variance estimates for the intercept factor ($D_i = .367$, $t = 4.501$, $p < .05$) indicated significant individual variability in the initial level of punishment for mistakes. A nonsignificant variance for the slope factor emerged ($D_s = .003$, $t = .085$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. Because no significant mean and variance estimates for the slope factor emerged no correlation between the intercept and slope factor was imposed on the model.

4.3.3 Summary of Findings

Table 8 and Table 9 summarise the results of the first step of study 2. Overall, for the self-perceptions of closeness, commitment and complementarity, for the meta-perceptions of complementarity and for perceptions of cooperative learning, and effort/improvement models showed significant linear decreases over time. For the perceptions of unequal recognition, the model showed significant linear increases over time. The significant variances in all variables' intercept factors suggested that the athletes' starting point varied substantially from the mean score. For self-perceptions of commitment, meta-perceptions of complementarity, cooperative learning, effort/improvement and unequal recognition results suggested that although the entire sample experienced changes over time no significant variances were found in individual variability. For self-perceptions of closeness and complementarity significant variances were found in the slope factor.

For the meta-perceptions of closeness and commitment as well as for the perceptions of important role and punishment for mistakes, univariate models showed no significant mean and variance scores in the slope factor.

Table 8: Summary of intercept (Mi) and slope (Ms) factor means and of intercept (Di) and the slope (Ds) factor variances

| | Mi (Mean Intercept) | Ms (Mean Slope) | Di (Variance Intercept) | Ds (Variance Slope) | R(Correlation Int*S) |
|--|---------------------|-----------------|-------------------------|---------------------|----------------------|
| Coach-Athlete Relationship Self-perceptions | | | | | |
| 1) Closeness | 5.546* | -.201* | .387* | .112* | - |
| $\chi^2 = 1.021, df=2, CFI=1.00,$ | sd .085 | .057 | .092 | .055 | |
| RMSEA=.00 (.00,.152) | t 65.013 | -3.557 | 4.205 | 2.033 | |
| 2) Commitment | 4.964* | -.132* | .499* | .068 | - |
| $\chi^2 = .328, df=2, CFI=1.00,$ | sd .092 | .057 | .103 | .052 | |
| RMSEA=.00 (.00,.103) | t 53.989 | -2.302 | 4.858 | 1.306 | |
| 3) Complementarity | 5.498* | -.171* | .501* | .194* | -.194 |
| $\chi^2 = 1.924, df=1, CFI=1.00,$ | sd .079 | .051 | .135 | .065 | .065 |
| RMSEA=.09 (.00,.284) | t 69.574 | -3.347 | 3.714 | 2.962 | -1.746 |
| Coach-Athlete Relationship Meta-perceptions | | | | | |
| 1) m-Closeness | 4.948* | -.058 | .407* | .085 | - |
| $\chi^2 = .914, df=2, CFI=1.00,$ | sd .086 | .053 | .090 | .049 | |
| RMSEA=.00 (.00,.148) | t 57.757 | -1.100 | 4.507 | 1.749 | |
| 2) m-Commitment | 4.498* | .032 | .328* | .131* | - |
| $\chi^2 = .827, df=2, CFI=1.00,$ | sd .084 | .057 | .088 | .056 | |
| RMSEA=.00 (.00,.143) | t 53.498 | .558 | 3.719 | 2.344 | |
| 3) m-Complementarity | 5.067* | -.115* | .302* | .080 | - |
| $\chi^2 = 2.018, df=2, CFI=.988,$ | sd .078 | .052 | .074 | .044 | |
| RMSEA=.009 (.00,.186) | t 65.211 | -2.210 | 4.084 | 1.824 | |
| Motivational Climate | | | | | |
| 1) Cooperative Learning | 4.220* | -.087* | .124* | .009 | - |
| $\chi^2 = 2.715, df=2, CFI=.986,$ | sd .055 | .032 | .031 | .016 | |
| RMSEA=.061 (.00,.220) | t 76.380 | -2.725 | 4.007 | .574 | |
| 2) Important Role | 3.994* | -.056 | .204* | .032 | - |
| $\chi^2 = 1.018, df=2, CFI=1.00,$ | sd .067 | .037 | .049 | .025 | |
| RMSEA=.00 (.00,.165) | t 59.547 | -1.509 | 4.211 | 1.303 | |
| 3) Effort/Improvement | 4.116* | -.090* | .186* | .025 | - |
| $\chi^2 = .406, df=2, CFI=1.00,$ | sd .059 | .030 | .039 | .018 | |
| RMSEA=.00 (.00,.122) | t 70.158 | -3.006 | 4.755 | 1.389 | |
| 4) Punishment for Mistakes | 2.753* | .065 | .367* | .003 | - |
| $\chi^2 = 2.547, df=2, CFI=.978,$ | sd .090 | .053 | .081 | .037 | |
| RMSEA=.053 (.00,.216) | t 30.565 | 1.232 | 4.501 | .085 | |
| 5) Unequal Recognition | 2.861* | .122* | .433* | .023 | - |
| $\chi^2 = .807, df=2, CFI=1.00,$ | sd .090 | .044 | .087 | .034 | |
| RMSEA=.00 (.00,.154) | t 31.788 | 2.794 | 4.951 | .668 | |

*p<.05

Table 9: Summary of change in the constructs of the coach-athlete relationship, and the motivational climate

| | Mi | Ms | Di | Ds | R _{I*s} |
|--|----|----|----|----|------------------|
| Coach-Athlete Relationship Self-perceptions | | | | | |
| 1) Closeness | √ | √ | √ | √ | - |
| 2) Commitment | √ | √ | √ | | - |
| 3) Complementarity | √ | √ | √ | √ | - |
| Coach-Athlete Relationship Meta-perceptions | | | | | |
| 1) Closeness | √ | | √ | | - |
| 2) Commitment | √ | | √ | √ | - |
| 3) Complementarity | √ | √ | √ | | - |
| Motivational Climate | | | | | |
| 1) Cooperative Learning | √ | √ | √ | | - |
| 2) Important Role | √ | | √ | | - |
| 3) Effort/Improvement | √ | √ | √ | | - |
| 4) Punishment for Mistakes | √ | | √ | | - |
| 5) Unequal Recognition | √ | √ | √ | | - |

N=114

4.3.4 Second Step in LGM. Research Questions Q2a and Q2b:

Predictors of Initial Status and Change

In the second step the unconditional models for the constructs that manifested significant fixed (mean scores) and random (variance scores) effects characterising the trajectories of the constructs over time were extended to include predictors to explain this individual variability. Thus, questions such as what characteristics of the athlete or the environment are associated with trajectories that start higher versus lower or increase more steeply versus less steeply can be answered by the incorporation of meaningful predictors.

Research has shown that gender can contribute to the different perceptions of the motivational climate (Kavussanu & Roberts, 1996; Kim, Chang, & Gu, 2003) and the coach-athlete relationship (Jowett & Don Carolis, 2004) held by male and female

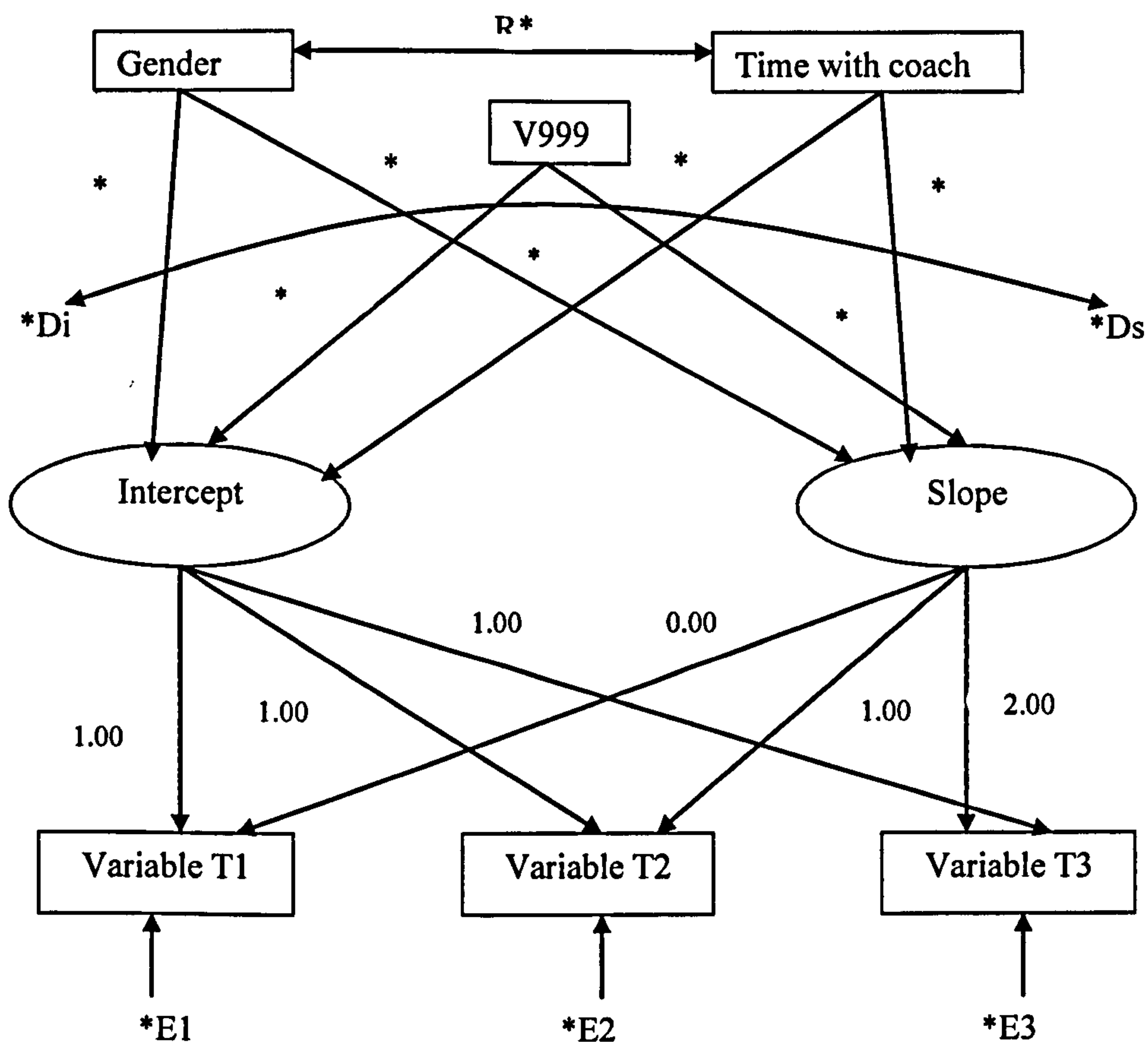
athletes. The above studies showed that males reported higher perceptions of an ego-involving climate than females, whereas males reported lower levels of closeness, commitment and complementarity. These results are partly in accordance with the findings of my first study in this thesis. More specifically, it was shown that males perceived higher levels of an ego-involving climate than females. On the other hand previous studies are not in accordance with the results of the study of this thesis where it was shown that male athletes perceived higher levels of closeness, commitment and complementarity than female athletes.

In the present study, it was expected that male athletes would perceive higher levels of an ego-involving climate at the beginning of the season and lower levels of a task-involving climate. Regarding the gender differences in perceptions of the coach-athlete relationship no certain predictions were made, due to the controversial results. Furthermore, no previous research to my knowledge has examined how the two genders differ in the rate with which they change their perceptions of the motivational climate and the coach-athlete relationship over an academic season, or longer. Thus, this study examined gender as a predictor of rate of change in an exploratory fashion.

Another variable likely to affect athletes' perceptions is the duration of the time the athletes have spent training with their coach. It was assumed in the present study that the longer the athletes have been training with their coach the higher the impact on their perceptions. It was assumed that athletes who had been training for a longer period of time with their coaches would perceive higher levels of closeness, commitment and complementarity. It was hypothesised that they would also perceive a more task-involving motivational climate, given the fact that literature review has shown that athletes who perceive a task-involving motivational climate operating in their team are less likely to withdraw (Whitehead et al., 2004) and report intentions of maintaining their athletic partnership for the following season (Fry & Newton, 2003).

The conditional model tested in the second step with gender and time spent with coach as predictors of change, is illuminated in Figure 10.

Figure 10 :Conditional univariate linear model



4.3.4.1 Results

Several univariate conditional models were tested including gender and time spent with one's coach. Gender was found to significantly predict the initial levels of meta-complementarity and unequal recognition. Specifically, the univariate conditional model for meta-complementarity with gender and years with coach as predictors of change fit the observed data well (χ^2 (3, N=114) = 3.132, $p > .05$, CFI = .987, RMSEA = .020 with 90CI = .00 to .161). Results indicated that gender predicted the intercept factor such that female athletes held higher meta-perceptions of complementarity. The univariate conditional model for unequal recognition with gender and years with coach as predictors of change fit the observed data moderately well (χ^2 (3, N=114) = 8.343, $p < .05$, CFI = .951, RMSEA = .136 with 90CI = .027 to .249). Results indicated that gender predicted the intercept factor such that female athletes held lower perceptions of unequal recognition. Whereas time spent with coach

as a predictor only marginally predicted the rate of change in perceptions of unequal recognition. Thus, the more time the athletes had spent with their coach the more unequal recognition they would perceive operating in their team.

4.3.5 Third Step in LGM. Research Questions Q3a, Q3b, Q3c and Q3d: Associative and Predictive Relationships between Perceptions of the Coach-Athlete Relationship and Motivational Climate over Time.

In the third step a series of multivariate trajectory models were constructed and examined. Following the conditional models in which significant trajectories were found over time the simultaneous examination of the trajectories of two repeated measures for two constructs were examined. Meta-perceptions of closeness and commitment, important role and punishment for mistakes were excluded from further analyses, as they did not exhibit linear growth over time. A series of multivariate trajectory models was tested, in which each one of the subscales of CART-Q was paired with one of the subscales of PMCSQ-2. Twelve models in total were constructed in which the multivariate relations between individual differences in developmental trajectories of coach-athlete relationship and developmental trajectories of motivational climate were examined. The following pairs were examined:

- *Model 1:* self-perceptions of closeness with perceptions of cooperative learning,
- *Model 2:* self-perceptions of closeness with perceptions of effort/ improvement,
- *Model 3:* self-perceptions of closeness with perceptions of unequal recognition,
- *Model 4:* self-perceptions of commitment with perceptions of cooperative learning,
- *Model 5:* self-perceptions of commitment with perceptions of effort/improvement,
- *Model 6:* self-perceptions of commitment with perceptions of unequal recognition,
- *Model 7:* self-perceptions of complementarity with perceptions of cooperative learning,
- *Model 8:* self-perceptions of complementarity with perceptions of effort/improvement,

- *Model 9*: self-perceptions of complementarity with perceptions of unequal recognition,
- *Model 10*: meta-perceptions of complementarity with perceptions of cooperative learning,
- *Model 11*: meta-perceptions of complementarity with perceptions of effort/improvement,
- *Model 12*: meta-perceptions of complementarity with perceptions of unequal recognition.

Bollen and Curran (2004) describe a bivariate latent trajectory model as an extension of the univariate model in the sense that it estimates simultaneously change in two or more variables over time. Further, Curran, Harford and Muthen (1996) proposed a hierarchical approach in which a simultaneous estimation of two univariate models with no added parameters serves as a baseline. That is, the two univariate models are examined together specifying no correlation/covariance, or prediction among their growth factor parameters. Then sets of parameters are introduced and the relative improvement of the model fit due to the added parameters is determined by the nested chi-square tests. For example, a covariance between their initial statuses, a covariance between their rates of change, and/or a parameter for the prediction of one variables' rate of growth accounted by the other variable's initial status. The baseline model tested can be viewed in Figure 11. The multivariate associative model tested can be viewed in Figure 12.

Figure 11: Multivariate baseline model with two variables

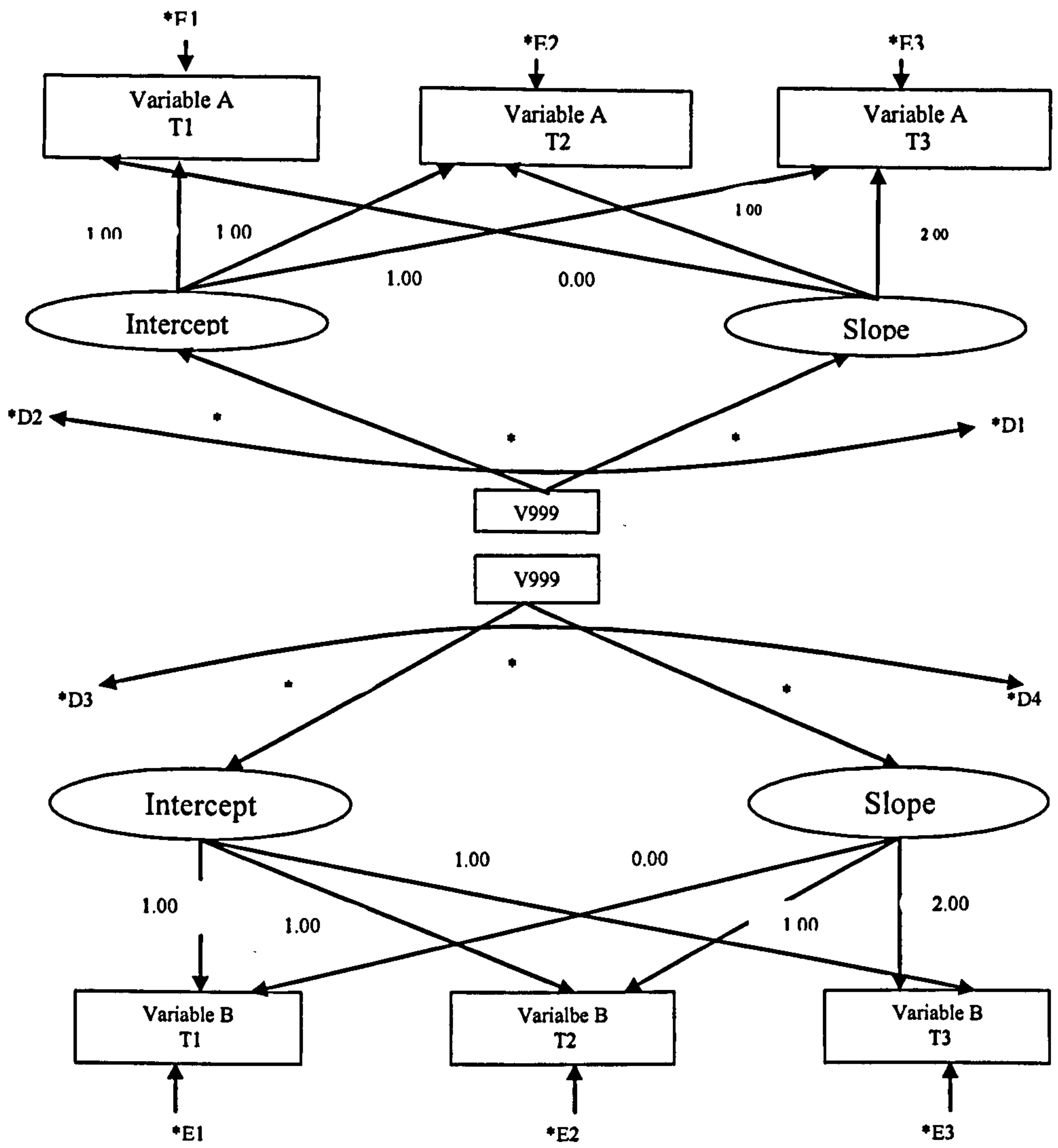
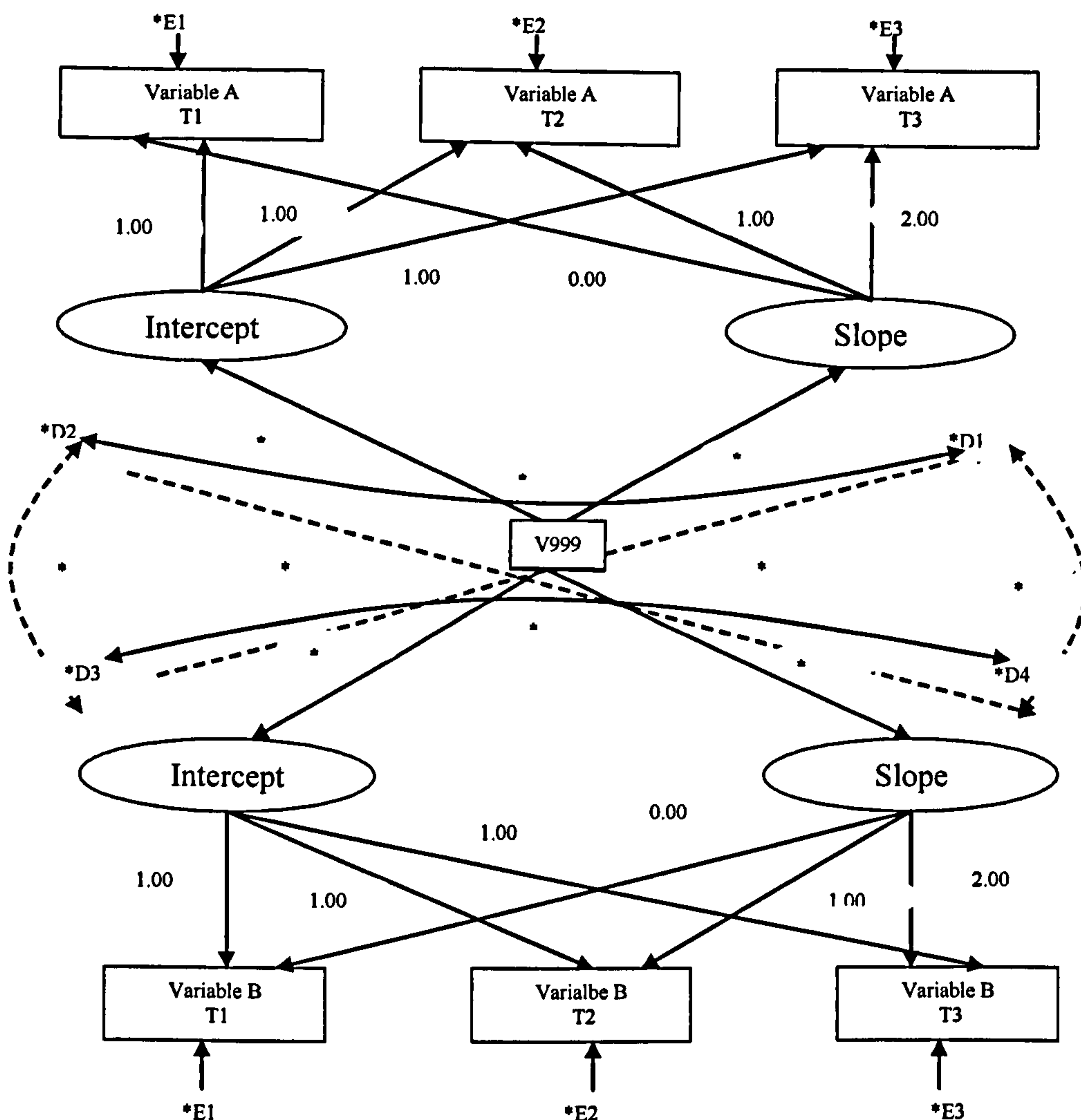


Figure 12: Multivariate (or Associative or bivariate) model with two variables



4.3.5.1 Results

4.3.5.2 Self-perceptions of the Coach-Athlete Relationship and Motivational Climate

Model 1: Self-perceptions of closeness and perceptions of cooperative learning. The baseline model did not fit the observed data well (χ^2 (14, N=114) = 72.064, $p > .05$, CFI = .618, RMSEA = .208 with 90CI = .161 to .254). The bivariate model fit the observed data well (χ^2 (11, N=114) = 15.158, $p > .05$, CFI = .968, RMSEA = .063 with 90CI = .00 to .132). The estimated means of the latent factors of closeness suggested that the model-implied mean trajectory was characterised by a significant high closeness mean score of 5.63 at the first time period ($M_i = 5.628$, $t = 60.935$, $p < .05$)

and a significantly decreasing slope of .26 units per time point during the study ($M_s = -.260$, $t = 4.153$, $p < .05$). The estimated means of the latent factors of cooperative learning suggested that the model-implied mean trajectory was characterised by a significantly high cooperative learning mean score of 4.22 at the first time period ($M_i = 4.220$, $t = 76.237$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.088$, $t = 2.764$, $p < .05$). Further, significant variance estimates for the closeness' intercept factor ($D_i = .391$, $t = 3.891$, $p < .05$) indicated significant individual variability in the initial level of closeness. A significant variance for the closeness' slope factor emerged ($D_s = .168$, $t = 2.915$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the cooperative learning's intercept factor ($D_i = .128$, $t = 4.296$, $p < .05$) indicated significant individual variability in the initial level of cooperative learning. A non-significant variance for the cooperative learning's slope factor emerged ($D_s = .014$, $t = .964$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between closeness and cooperative learning's intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(cl)} *_{i(cooplearn)} = .164$, $t = 3.833$, $p < .05$) on how the two variables started. The estimated correlation between closeness and cooperative learning's slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(cl)} *_{s(cooplearn)} = .059$, $t = 3.579$, $p < .05$). The estimated regression of the closeness slope on the cooperative learning's intercept was not significant indicating that initial levels of cooperative learning cannot predict the rate of change in closeness. The estimated regression of the cooperative learning slope on the closeness' intercept was not significant indicating that initial levels of closeness cannot predict the rate of change in cooperative learning.

Model 2: Self-perceptions of closeness and perceptions of effort/ improvement. The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 84.672$, $p > .05$, CFI = .642, RMSEA = .229 with 90CI = .182 to .275). The bivariate model fit the observed data well ($\chi^2 (11, N=114) = 5.628$, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .045). The estimated means of the latent factors of closeness suggested that the model-implied mean trajectory was characterised by a significant high closeness mean score of 5.63 at the first time period ($M_i = 5.628$, $t = 61.457$, $p < .05$) and a significantly decreasing slope of .26 units per time point during the study ($M_s =$

-.260, $t = 4.117$, $p < .05$). The estimated means of the latent factors of effort/ improvement suggested that the model-implied mean trajectory was characterised by a significant high effort/ improvement mean score of 4.12 at the first time period ($M_i = 4.116$, $t = 69.124$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.090$, $t = 3.039$, $p < .05$). Further, significant variance estimates for the closeness' intercept factor ($D_i = .386$, $t = 3.919$, $p < .05$) indicated significant individual variability in the initial level of closeness. A significant variance for the closeness' slope factor emerged ($D_s = .188$, $t = 3.296$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the effort/ improvement intercept factor ($D_i = .201$, $t = 5.221$, $p < .05$) indicated significant individual variability in the initial level of effort/ improvement. A non-significant variance for the effort/ improvement slope factor emerged ($D_s = .022$, $t = 1.530$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between closeness and effort/ improvement intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(clos)} *_{i(eff)} = .221$, $t = 4.377$, $p < .05$). The estimated correlation between closeness and effort/ improvement slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(clos)} *_{s(eff)} = .071$, $t = 4.140$, $p < .05$). The estimated regression of the closeness slope on the effort/ improvement intercept was not significant indicating that initial levels of effort/ improvement cannot predict the rate of change in closeness. The estimated regression of the effort/ improvement slope on the closeness' intercept was not significant indicating that initial levels of closeness cannot predict the rate of change in effort/ improvement.

Model 3: Self-perceptions of closeness and perceptions of unequal recognition.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 39.804$, $p > .05$, CFI= .846, RMSEA= .139 with 90CI = .089 to .189). The bivariate model fit the observed data well ($\chi^2 (10, N=114) = 3.793$, $p > .05$, CFI= 1.00, RMSEA= .00 with 90CI = .00 to .00). The estimated means of the latent factors of closeness suggested that the model-implied mean trajectory was characterised by a significant high closeness mean score of 5.63 at the first time period ($M_i = 5.628$, $t = 60.612$, $p < .05$) and a significantly decreasing slope of .26 units per time point during the study ($M_s = -.259$, $t = 4.183$, $p < .05$). The estimated means of the latent factors of unequal

recognition suggested that the model-implied mean trajectory was characterised by a significant medium unequal recognition mean score of 2.87 at the first time period ($M_i = 2.869$, $t = 31.119$, $p < .05$) and a significantly decreasing slope of 1.37 units per time point during the study ($M_s = -1.373$, $t = -2.203$, $p < .05$). Further, significant variance estimates for the closeness' intercept factor ($D_i = .385$, $t = 3.728$, $p < .05$) indicated significant individual variability in the initial level of closeness. A significant variance for the closeness' slope factor emerged ($D_s = .180$, $t = 2.980$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the unequal recognition intercept factor ($D_i = .546$, $t = 4.744$, $p < .05$) indicated significant individual variability in the initial level of unequal recognition. A non-significant variance for the unequal recognition slope factor emerged ($D_s = .047$, $t = 1.481$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated negative correlation between closeness and unequal recognition intercepts was significant indicating that there was a small negative association between their initial levels at Time 1 ($R_{i(\text{clos})}^* i(\text{unrec}) = -.279$, $t = -3.545$, $p < .05$). The estimated negative correlation between closeness and unequal recognition slopes was significant indicating that there was a small negative association between their rates of change over time ($R_{s(\text{clos})}^* s(\text{unrec}) = -.091$, $t = 3.837$, $p < .05$). The estimated regression of the closeness slope on the unequal recognition intercept was not significant indicating that initial levels of unequal recognition cannot predict the rate of change in closeness. The estimated regression of the unequal recognition slope on the closeness' intercept was significant ($R_{i(\text{clos})}^* R_{s(\text{unrec})} = .265$, $t = 2.401$, $p < .05$) indicating that initial levels of closeness could predict the rate of change in unequal recognition. More specifically, higher levels of closeness could predict less steep increases in unequal recognition.

Model 4: Self-perceptions of commitment and perceptions of cooperative learning.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 77.265$, $p < .05$, CFI = .625, RMSEA = .217 with 90CI = .170 to .263). The model fit the observed data well ($\chi^2 (10, N=114) = 19.414$, $p < .05$, CFI = .940, RMSEA = .099 with 90CI = .025 to .164). The estimated means of the latent factors of commitment suggested that the model-implied mean trajectory was characterised by a significant high commitment mean score of 5.04 at the first time period ($M_i = 5.039$, $t = 48.858$, $p < .05$) and a significantly decreasing slope of .19 units per time point during the

study ($M_s = -.187$, $t = 2.918$, $p < .05$). The estimated means of the latent factors of cooperative learning suggested that the model-implied mean trajectory was characterised by a significant high cooperative learning mean score of 4.22 at the first time period ($M_i = 4.221$, $t = 77.318$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.087$, $t = 2.672$, $p < .05$). Further, significant variance estimates for the commitment intercept factor ($D_i = .573$, $t = 4.878$, $p < .05$) indicated significant individual variability in the initial level of commitment. A non-significant variance for the commitment slope factor emerged ($D_s = .098$, $t = 1.705$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. Significant variance estimates for the cooperative learning's intercept factor ($D_i = .119$, $t = 3.913$, $p < .05$) indicated significant individual variability in the initial level of cooperative learning. A non-significant variance for the cooperative learning's slope factor emerged ($D_s = .016$, $t = 1.095$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between commitment and cooperative learning's intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(\text{comm.})} * R_{i(\text{coop})} = .228$, $t = 4.514$, $p < .05$). The estimated correlation between commitment and cooperative learning's slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(\text{comm.})} * R_{s(\text{coop})} = .078$, $t = 3.972$, $p < .05$). The estimated regression coefficient of the commitment slope and the cooperative learning intercept was significant ($R_{s(\text{comm.})} * i(\text{coop}) = -.082$, $t = 2.690$, $p < .05$) indicating that initial levels of cooperative learning could predict the rate of change in commitment.

Model 5: Self-perceptions of commitment and perceptions of effort/ improvement.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 64.780$, $p < .05$, CFI = .729, RMSEA = .194 with 90CI = .147 to .241). The bivariate model fit the observed data well ($\chi^2 (11, N=114) = 9.500$, $p < .05$, CFI = .998, RMSEA = .00 with 90CI = .00 to .095). The estimated means of the latent factors of commitment suggested that the model-implied mean trajectory was characterised by a significant high commitment mean score of 5.04 at the first time period ($M_i = 5.038$, $t = 50.715$, $p < .05$) and a significantly decreasing slope of .19 units per time point during the study ($M_s = -.187$, $t = -2.935$, $p < .05$). The estimated means of the latent factors of effort/ improvement suggested that the model-implied mean trajectory was

characterised by a significant high effort/ improvement mean score of 4.12 at the first time period ($M_i = 4.116$, $t = 68.843$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.090$, $t = -3.015$, $p < .05$). Further, significant variance estimates for the commitment intercept factor ($D_i = .523$, $t = 4.583$, $p < .05$) indicated significant individual variability in the initial level of commitment. A significant variance for the commitment slope factor emerged ($D_s = .144$, $t = 2.504$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the effort/ improvement intercept factor ($D_i = .200$, $t = 5.125$, $p < .05$) indicated significant individual variability in the initial level of effort/ improvement. A non-significant variance for the effort/ improvement slope factor emerged ($D_s = .023$, $t = 1.465$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between commitment and effort/ improvement intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(\text{comm.})}^*_{i(\text{eff})} = .202$, $t = 3.810$, $p < .05$). The estimated correlation between commitment and effort/ improvement slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(\text{comm.})}^*_{s(\text{eff})} = .066$, $t = 3.844$, $p < .05$). The estimated regression of the commitment slope on the effort/ improvement intercept was not significant indicating that initial levels of effort/ improvement cannot predict the rate of change in commitment. The estimated regression of the effort/ improvement slope on the commitment intercept was not significant indicating that initial levels of commitment cannot predict the rate of change in effort/ improvement.

Model 6: Self-perceptions of commitment and perceptions of unequal recognition.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 27.788$, $p > .05$, CFI= .914, RMSEA= .101 with 90CI = .043 to .155). The bivariate model fit the observed data well ($\chi^2 (10, N=114) = 4.951$, $p > .05$, CFI= 1.00, RMSEA= .00 with 90CI = .00 to .050). The estimated means of the latent factors of commitment suggested that the model-implied mean trajectory was characterised by a significant high commitment mean score of 5.04 at the first time period ($M_i = 5.039$, $t = 49.661$, $p < .05$) and a significantly decreasing slope of .19 units per time point during the study ($M_s = -.187$, $t = 2.923$, $p < .05$). The estimated means of the latent factors of unequal recognition suggested that the model-implied mean trajectory was

characterised by a significant medium unequal recognition mean score of 2.87 at the first time period ($M_i = 2.865$, $t = 31.368$, $p < .05$) and a significantly decreasing slope of .74 units per time point during the study ($M_s = -.739$, $t = -1.713$, $p < .05$). Further, significant variance estimates for the commitment intercept factor ($D_i = .519$, $t = 4.366$, $p < .05$) indicated significant individual variability in the initial level of commitment. A significant variance for the commitment slope factor emerged ($D_s = .126$, $t = 2.112$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the unequal recognition intercept factor ($D_i = .491$, $t = 4.846$, $p < .05$) indicated significant individual variability in the initial level of unequal recognition. A non-significant variance for the unequal recognition slope factor emerged ($D_s = .034$, $t = 1.044$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated negative correlation between commitment and unequal recognition intercepts was significant indicating that there was a small negative association between their initial levels at Time 1 ($R_{i(\text{comm.})}^*_{i(\text{unrec})} = -.212$, $t = -2.571$, $p < .05$). The estimated negative correlation between commitment and unequal recognition slopes was significant indicating that there was a small negative association between their rates of change over time ($R_{s(\text{comm.})}^*_{s(\text{unrec})} = -.083$, $t = 3.401$, $p < .05$). The estimated regression of the commitment slope on the unequal recognition intercept was not significant indicating that initial levels of unequal recognition cannot predict the rate of change in commitment. The estimated regression of the unequal recognition slope on the commitment intercept was significant ($R_{i(\text{comm.})}^*_{s(\text{unrec})} = .171$, $t = 2.005$, $p < .05$) indicating that initial levels of commitment could predict the rate of change in unequal recognition. More specifically, higher initial levels of commitment could predict steeper decreases in unequal recognition.

Model 7: Self-perceptions of complementarity and perceptions of cooperative learning.

The baseline model did not fit the observed data well ($\chi^2(14, N=114) = 88.846$, $p > .05$, CFI = .579, RMSEA = .236 with 90CI = .189 to .282). The bivariate model fit the observed data well ($\chi^2(11, N=114) = 21.315$, $p > .05$, CFI = .934, RMSEA = .109 with 90CI = .042 to .172). The estimated means of the latent factors of complementarity suggested that the model-implied mean trajectory was characterised by a significant high complementarity mean score of 5.55 at the first time period ($M_i = 5.552$, $t = 69.844$, $p < .05$) and a significantly decreasing slope of .22 units per time point during

the study ($M_s = -.220$, $t = 4.103$, $p < .05$). The estimated means of the latent factors of cooperative learning suggested that the model-implied mean trajectory was characterised by a significant high cooperative learning mean score of 4.22 at the first time period ($M_i = 4.224$, $t = 79.725$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.091$, $t = 2.930$, $p < .05$). Further, significant variance estimates for the complementarity intercept factor ($D_i = .287$, $t = 3.858$, $p < .05$) indicated significant individual variability in the initial level of complementarity. A significant variance for the complementarity slope factor emerged ($D_s = .147$, $t = 3.477$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the cooperative learning's intercept factor ($D_i = .063$, $t = 1.426$, $p < .05$) indicated significant individual variability in the initial level of cooperative learning. A non-significant variance for the cooperative learning's slope factor emerged ($D_s = .000$, $t = .000$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between complementarity and cooperative learning's intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(\text{compl})} * i(\text{coop}) = .145$, $t = 3.953$, $p < .05$). The estimated correlation between complementarity and cooperative learning's slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(\text{compl})} * s(\text{coop}) = .059$, $t = 4.169$, $p < .05$). The estimated regression of the complementarity slope on the cooperative learning's intercept was not significant indicating that initial levels of cooperative learning cannot predict the rate of change in complementarity. The estimated regression of the cooperative learning slope on the complementarity intercept was not significant indicating that initial levels of complementarity cannot predict the rate of change in cooperative learning.

Model 8: of Self-perceptions complementarity and perceptions of effort/ improvement.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 68.518$, $p > .05$, CFI = .712, RMSEA = .201 with 90CI = .154 to .248). The bivariate model fit the observed data well ($\chi^2 (11, N=114) = 8.789$, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .089). The estimated means of the latent factors of complementarity suggested that the model-implied mean trajectory was characterised by a significant high complementarity mean score of 5.55 at the first time period ($M_i = 5.554$, $t = 70.724$, $p < .05$) and a significantly decreasing slope of .22 units per time point during

the study ($M_s = -.217$, $t = 4.097$, $p < .05$). The estimated means of the latent factors of effort/ improvement suggested that the model-implied mean trajectory was characterised by a significant high effort/ improvement mean score of 4.12 at the first time period ($M_i = 4.116$, $t = 69.839$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.090$, $t = 2.990$, $p < .05$). Further, significant variance estimates for the complementarity intercept factor ($D_i = .280$, $t = 3.762$, $p < .05$) indicated significant individual variability in the initial level of complementarity. A significant variance for the complementarity slope factor emerged ($D_s = .176$, $t = 3.914$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the effort/ improvement intercept factor ($D_i = .190$, $t = 5.027$, $p < .05$) indicated significant individual variability in the initial level of effort/ improvement. A non-significant variance for the effort/ improvement slope factor emerged ($D_s = .031$, $t = 2.003$, $p < .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between complementarity and effort/ improvement intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(clos)}^*_{i(eff)} = .151$, $t = 3.659$, $p < .05$). The estimated correlation between complementarity and effort/ improvement slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(clos)}^*_{s(eff)} = .063$, $t = 4.283$, $p < .05$). The estimated regression of the complementarity slope on the effort/ improvement intercept was not significant indicating that initial levels of effort/ improvement cannot predict the rate of change in complementarity. The estimated regression of the effort/ improvement slope on the complementarity intercept was not significant indicating that initial levels of complementarity cannot predict the rate of change in effort/ improvement.

Model 9: Self-perceptions of complementarity and perceptions of unequal recognition.

The baseline model did not fit the observed data well ($\chi^2 (14, N=114) = 36.304$, $p < .05$, CFI= .871, RMSEA= .129 with 90CI = .078 to .180). The bivariate model fit the observed data well ($\chi^2 (10, N=114) = 11.311$, $p > .05$, CFI= .988, RMSEA=.037 with 90CI = .00 to .120). The estimated means of the latent factors of complementarity suggested that the model-implied mean trajectory was characterised by a significant high complementarity mean score of 5.55 at the first time period ($M_i = 5.552$, $t = 70.001$, $p < .05$) and a significantly decreasing slope of .22 units per time

point during the study ($M_s = -.216$, $t = -4.069$, $p > .05$). The estimated means of the latent factors of unequal recognition suggested that the model-implied mean trajectory was characterised by a significant medium unequal recognition mean score of 2.87 at the first time period ($M_i = 2.866$, $t = 31.083$, $p < .05$) and a significantly decreasing slope of 1.69 units per time point during the study ($M_s = -1.692$, $t = -2.166$, $p < .05$). Further, significant variance estimates for the complementarity intercept factor ($D_i = .269$, $t = 3.442$, $p < .05$) indicated significant individual variability in the initial level of complementarity. A significant variance for the complementarity slope factor emerged ($D_s = .178$, $t = 3.590$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the unequal recognition intercept factor ($D_i = .524$, $t = 4.753$, $p < .05$) indicated significant individual variability in the initial level of unequal recognition. A non-significant variance for the unequal recognition slope factor emerged ($D_s = .033$, $t = 1.022$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated negative correlation between complementarity and unequal recognition intercepts was significant indicating that there was a small negative association between their initial levels at Time 1 ($R_{i(\text{comp.})} * i(\text{unrec}) = -.182$, $t = -2.770$, $p < .05$). The estimated negative correlation between complementarity and unequal recognition slopes was significant indicating that there was a small negative association between their rates of change over time ($R_{s(\text{comp.})} * s(\text{unrec}) = -.071$, $t = -3.572$, $p < .05$). The estimated regression of the complementarity slope on the unequal recognition intercept was not significant indicating that initial levels of unequal recognition cannot predict the rate of change in complementarity. The estimated regression of the unequal recognition slope on the complementarity intercept was significant ($R_{i(\text{comp.})} * s(\text{unrec}) = .327$, $t = 2.324$, $p < .05$) indicating that initial levels of complementarity could predict the rate of change in unequal recognition. More specifically, higher levels of complementarity could predict steeper decreases in unequal recognition.

4.3.5.3 Meta-Perceptions of the Coach-Athlete Relationship and Motivational Climate

Model 10: Meta-perceptions of complementarity and perceptions of cooperative learning. The baseline model did not fit the observed data well (χ^2 (14, N=114) = 85.889, $p > .05$, CFI = .569, RMSEA = .231 with 90CI = .184 to .277). The bivariate

model fit the observed data well (χ^2 (11, N=114) = 11.100, $p > .05$, CFI= 1.00, RMSEA=.00 with 90CI =.00 to .107). The estimated means of the latent factors of meta-complementarity suggested that the model-implied mean trajectory was characterised by a significant high meta-complementarity mean score of 5.12 at the first time period ($M_i = 5.118$, $t = 62.726$, $p < .05$) and a significantly decreasing slope of .16 units per time point during the study ($M_s = -.162$, $t = 2.939$, $p < .05$). The estimated means of the latent factors of cooperative learning suggested that the model-implied mean trajectory was characterised by a significant high cooperative learning mean score of 4.22 at the first time period ($M_i = 4.220$, $t = 77.672$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.087$, $t = -2.714$, $p < .05$). Further, significant variance estimates for the meta-complementarity intercept factor ($D_i = .320$, $t = 4.171$, $p < .05$) indicated significant individual variability in the initial level of meta-complementarity. A significant variance for the meta-complementarity slope factor emerged ($D_s = .114$, $t = 2.693$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the cooperative learning's intercept factor ($D_i = .120$, $t = 4.262$, $p < .05$) indicated significant individual variability in the initial level of cooperative learning. A non-significant variance for the cooperative learning's slope factor emerged ($D_s = .015$, $t = 1.054$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between meta-complementarity and cooperative learning's intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(\text{compl})}^* i(\text{coop}) = .150$, $t = 4.003$, $p < .05$). The estimated correlation between meta-complementarity and cooperative learning's slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(\text{compl})}^* s(\text{coop}) = .060$ $t = 4.013$ $p < .05$). The estimated regression of the meta-complementarity slope on the cooperative learning's intercept was not significant indicating that initial levels of cooperative learning cannot predict the rate of change in meta-complementarity. The estimated regression of the cooperative learning slope on the meta-complementarity intercept was not significant indicating that initial levels of meta-complementarity cannot predict the rate of change in cooperative learning.

Model 11: Meta-perceptions of complementarity and perceptions of effort/improvement. The baseline model did not fit the observed data well (χ^2 (14, N=114) =

64.006, $p > .05$, CFI = .719, RMSEA = .193 with 90CI = .145 to .240). The bivariate model fit the observed data well (χ^2 (11, N=114) = 9.568, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .095). The estimated means of the latent factors of meta-complementarity suggested that the model-implied mean trajectory was characterised by a significant high meta-complementarity mean score of 5.12 at the first time period ($M_i = 5.117$, $t = 62.529$, $p < .05$) and a significantly decreasing slope of .16 units per time point during the study ($M_s = -.163$, $t = -2.995$, $p < .05$). The estimated means of the latent factors of effort/ improvement suggested that the model-implied mean trajectory was characterised by a significant high effort/ improvement mean score of 4.12 at the first time period ($M_i = 4.116$, $t = 71.056$, $p < .05$) and a significantly decreasing slope of .09 units per time point during the study ($M_s = -.091$, $t = -2.958$, $p < .05$). Further, significant variance estimates for the meta-complementarity intercept factor ($D_i = .327$, $t = 4.212$, $p < .05$) indicated significant individual variability in the initial level of meta-complementarity. A significant variance for the meta-complementarity slope factor emerged ($D_s = .115$, $t = 2.647$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the effort/ improvement intercept factor ($D_i = .178$, $t = 4.936$, $p < .05$) indicated significant individual variability in the initial level of effort/ improvement. A non-significant variance for the effort/ improvement slope factor emerged ($D_s = .021$, $t = 1.394$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated correlation between meta-complementarity and effort/ improvement intercepts was significant indicating that there was a small association between their initial levels at Time 1 ($R_{i(\text{comp})}^*_{i(\text{eff})} = .151$, $t = 3.630$, $p < .05$). The estimated correlation between meta-complementarity and effort/ improvement slopes was significant indicating that there was a small association between their rates of change over time ($R_{s(\text{comp})}^*_{s(\text{eff})} = .058$, $t = 3.942$, $p < .05$). The estimated regression of the meta-complementarity slope on the effort/ improvement intercept was not significant indicating that initial levels of effort/ improvement cannot predict the rate of change in meta-complementarity. The estimated regression of the effort/ improvement slope on the meta-complementarity intercept was not significant indicating that initial levels of meta-complementarity cannot predict the rate of change in effort/ improvement.

Model 12: Meta-perceptions of complementarity and perceptions of unequal recognition. The baseline model did not fit the observed data so well (χ^2 (14, N=114) = 18.945, $p > .05$, CFI = .968, RMSEA = .061 with 90CI = .00 to .023). The bivariate model fit the observed data well (χ^2 (10, N=114) = 8.528, $p > .05$, CFI = 1.00, RMSEA = .00 with 90CI = .00 to .098). The estimated means of the latent factors of meta-complementarity suggested that the model-implied mean trajectory was characterised by a significant high meta-complementarity mean score of 5.12 at the first time period ($M_i = 5.121$, $t = 62.841$, $p < .05$) and a significantly decreasing slope of .16 units per time point during the study ($M_s = -.163$, $t = -2.908$, $p < .05$). The estimated means of the latent factors of unequal recognition suggested that the model-implied mean trajectory was characterised by a significant medium unequal recognition mean score of 2.87 at the first time period ($M_i = 2.865$, $t = 31.330$, $p < .05$) and a significantly decreasing slope of 1.32 units per time point during the study ($M_s = -1.324$, $t = -2.045$, $p < .05$). Further, significant variance estimates for the meta-complementarity intercept factor ($D_i = .293$, $t = 3.741$, $p < .05$) indicated significant individual variability in the initial level of meta-complementarity. A significant variance for the meta-complementarity slope factor emerged ($D_s = .117$, $t = 2.468$, $p < .05$), indicating that there was individual variability in each athlete's rate of change. Significant variance estimates for the unequal recognition intercept factor ($D_i = .492$, $t = 4.822$, $p < .05$) indicated significant individual variability in the initial level of unequal recognition. A non-significant variance for the unequal recognition slope factor emerged ($D_s = .031$, $t = .908$, $p > .05$), indicating that there was no individual variability in each athlete's rate of change. The estimated negative correlation between meta-complementarity and unequal recognition intercepts was significant indicating that there was a small negative association between their initial levels at Time 1 ($R_{i(\text{comp.})}^* i(\text{unrec}) = -.138$, $t = -2.125$, $p < .05$). The estimated negative correlation between meta-complementarity and unequal recognition slopes was significant indicating that there was a small negative association between their rates of change over time ($R_{s(\text{comm.})}^* s(\text{unrec}) = -.048$, $t = -2.314$, $p < .05$). The estimated regression of the meta-complementarity slope on the unequal recognition intercept was not significant indicating that initial levels of unequal recognition cannot predict the rate of change in meta-complementarity. The estimated regression of the unequal recognition slope on the meta-complementarity intercept was significant ($R_{i(\text{comm.})}^* s(\text{unrec}) = .282$, $t = 2.238$, $p < .05$) indicating that initial levels of meta-complementarity could predict the rate of

change in unequal recognition. More specifically, higher initial levels of meta-perceptions of complementarity could predict steeper decreases in unequal recognition.

Summary of results of the third step in the LGM

Results revealed a pattern in terms of correlations and predictions between the constructs of the coach-athlete relationship and the elements of the motivational climate. Small but significant correlations were observed in all the models between the initial levels of perceptions of closeness, commitment complementarity and meta-perceptions of complementarity with the initial levels of perceptions of cooperative learning, effort/improvement and unequal recognition. Small but significant correlations were observed in all the models between the rates of change in perceptions of closeness, commitment complementarity with the rates of change in perceptions of cooperative learning, effort/improvement and unequal recognition. Moreover, perceptions of unequal recognition were predicted by athletes' self-perceptions closeness, commitment and complementarity and meta-perceptions of complementarity (see Table 10).

Table 10: Predictions from the multivariate models

| Predictor (initial levels) | Criterion (rate of change) | Regression Coeff. | t | p |
|----------------------------|----------------------------|----------------------|-------|-------|
| Unequal Recognition | | | | |
| Self-Closeness | | .265 | 2.401 | < .05 |
| Self-Commitment | | .171 | 2.005 | < .05 |
| Self-Complementarity | | .327 | 2.324 | < .05 |
| Meta-Complementarity | | .282 | 2.238 | < .05 |

4.4 Overall Discussion of the LGM Analyses

The second study focused on growth and change in athletes' perceptions of the motivational climate and the coach-athlete relationship. Linear growth modelling (LGM) was used as a statistical technique to analyse the data. Three steps were followed to answer specific research questions and address the research hypotheses

described at the beginning of the chapter. A detailed description of each step in the LGM and its contribution in the research questions follows. Results of the three steps in LGM provided answers to the research questions and lent more evidence on the study of perceptions of the motivational climate and coach-athlete relationship and will be discussed within the context of each step taken to address each research question.

The first step of the LGM analysis sought to answer questions 1a and 1b relating to evidence of systematic change and individual variability in athletes' perceptions of a) the coach-athlete relationship (*Q1a*) and b) motivational climate over time (*Q1b*). A series of unconditional linear growth models were estimated in the first step to establish the growth function over time.

Is there evidence for systematic change and individual variability in change in athletes' perceptions of the coach-athlete relationship over time (Q1a)?

Stability

Results showed that the sample did not reveal any significant linear changes in meta-perceptions of closeness and commitment. This may indicate that the pattern of growth could not be modelled with three time points, or that there was no change of perceptions over an academic season.

The former explanation refers to the design and processes included in the Latent Growth Modeling. Non-linear rates of change can be captured by the quadratic function (Duncan, Duncan, Strycker, Li, & Alpert, 1999; McArdle, 1991). Thus, an alternative to the linear model is the quadratic model. Whereas there are two latent factors in the linear model, the intercept and the slope factors, a third latent factor is included in the quadratic model that captures any curvature in the individual trajectories. However, a basic requirement to test for non-linear/ curvilinear effects is that a minimum of four repeated measures is needed to overidentify a quadratic model (Curran, 2000; Curran & Hussong, 2003). In the present study, three repeated measures were taken for the constructs under investigation thus not allowing for the test of non-linear effects.

The latter proposed explanation is more straightforward and supported by the data. Results from the current study showed that athletes' meta-perceptions of closeness

and commitment remained stable across time, at least over the nine-month academic season. Meta-perceptions of closeness and commitment refer to athletes' inferences regarding the coach's feelings and cognitions. Athletes scored high on both meta-perceptions dimensions at the beginning of the season and at the two later stages of the research, which suggests it was essential for the athletes to continue to perceive and infer high levels of closeness and commitment on behalf of their coach in order to continue to perceive an effective athletic relationship. Jowett and Clark-Carter (2005) highlighted that assumed similarity constitutes an important determinant in a dyadic relationship. They conceptualised "assumed similarity" in the coach-athlete relationship as the level of agreement in the athlete's own (i.e., self-) and his/her meta-perceptions of the 3 Cs. Although assumed similarity was not measured here, athletes' scores on their self- and meta-perceptions of closeness, commitment and complementarity were high and closely correlated. Athletes' assumptions that their coach shares similar views (e.g., high levels of closeness, commitment and complementarity) and the maintenance of these assumptions set the foundation for their athletic relationship, connect them and offer common ground for inferences and mutual views (Duck, 1994). Therefore, an important determinant for the coach-athlete relationship is the extent to which its members think that the other member hold views and opinions similar to their own (Byrne, 1971). For instance, athletes are more likely to trust, like, respect and be committed to their coach if they perceive that their coach shares the same feelings and cognitions towards them.

Change

In addition, results showed that athletes in the present study started with high self-perceptions of closeness, commitment complementarity, and meta-perceptions of complementarity, but these perceptions declined over time. A closer look at the athletes' mean scores on the 3 Cs across all three time points, revealed that although the decline was statistically significant, it was not steep (ranging from .12 to .20 points), indicating that athletes still perceived high levels of the three constructs at the end of the season.

In the university context, this finding is not surprising. The type of interaction that the athletes perceived (and that they thought that their coach perceived) as cooperative and effective at the beginning of the season (the preparation period), changed when

teams entered the high competitive season. A relatively strong coach-athlete relationship at the beginning of the season was perceived as more distant over the course of season as demands for better results and pressure placed upon both coach and athletes increased.

The drop in athletes' perceptions of the 3 Cs might reflect the end result of continuous defeats or poor performances, dissatisfaction with the results of their own and/or their team's performance. The athletes consequently might have felt less proximity with their coach less respect, like and trust and perceptions of overall closeness may have decreased. A decline in commitment might have been the consequence of competitive outcomes, or controversial achievement goals between the athlete and the coach. Elevated levels of stress might have impacted on athletes' perceptions of complementarity, urging them to feel less at ease and less friendly in their interaction, especially if the athletes perceived the coaches to be the sources of stress.

Is there evidence for systematic change in athletes' perceptions of the coach-created motivational climate over time (Q1b)?

Stability

Results showed that the sample did not reveal any significant linear changes in perceptions of important role and punishment for mistakes, over time. This finding could be interpreted as explicated before, that either changes were not linear or that there was no true growth over the academic season. The first explanation was described in detail earlier. The second explanation relates to the stability of the perceptions across time. In relation to athletes' scores on perceptions of important role (sub-dimension of the task-involving climate), the present results showed that perceptions might have remained stable across time. This could be due to the fact that the athletes perceived important role as essential for their continuous involvement in their sport. In this study, athletes scored high on this sub-dimension of the task-involving climate at the onset of the season, which suggests that their views on the value of their role in the team were vital for their participation in sport. It might be assumed that if athletes perceived that the coach believed that they were not crucial for the operation and success of the team and that the athletes did not contribute in some important way that they would be likely to drop out. Even when athletes are not selected for games they might still perceive that they play an essential role in training

process. Carron and Hausenblas (1998) identified informal roles that individuals can play in a team such as team clown, social facilitator, or motivator and formal roles prescribed by the coach to the players that encompass specific task-related behaviours, positional or captaincy issues. Thus, irrespective of skill level, athletes perceived in the present study that their coach evaluated their role as important for the team throughout the study.

This lends support to previous research, which, adopting a two-wave longitudinal design showed that withdrawal was most likely when athletes perceived that superiority over their team mates was used as the criteria for evaluating their ability within their team (Whitehead et al., 2004). Past empirical research and present findings show that it is vital that athletes perceive their coach to treat all members of the team equally, and to value all the players as important elements for the success of the team.

Accordingly, athletes' scores on the punishment for mistakes dimension of the climate were low to moderate in the beginning of the season. Results showed that there was no change in these scores over the course of a season. This could be attributed to the coaches' education as discussed in the methodology section, in the description of the sample. It could also be due to high standards set within the university and the need to be successful. On occasion, when team success is being threatened, the coaches may feel the need to demonstrate punitive behaviours. However, this is infrequent as demonstrated by the low to moderate athletes' perception scores on this dimension.

Change

Results showed that athletes in the present study started with high perceptions of cooperative learning, and effort/improvement showing significant linear decreases over time. On the contrary, perceptions of unequal recognition were low in the beginning of the academic year and showed significant linear increases over time (i.e. athletes perceived a decline in task climate and a rise in ego climate). Coaches' focus on subsequent periods was not only on training goals, improving performance and mastering the skills as in the preparation period, but on normative criteria and evaluation. The pattern changed accordingly, in that athletes perceived that the coaches' focal point on fostering cooperative learning among the players and improvement through effort changed in a negative direction. A comparative element

arose, while unequal recognition was more salient and normative criteria were accentuated with more emphasis being placed on competitive results. A closer look at the mean values of variables under investigation reveals that although there was a decrease in perceptions of the coach-athlete relationship and task climate and an increase in perceptions of an ego climate the changes were not steep.

A number of reasons might have contributed to these changes. Different coaching behaviours have been reported in winning and losing coaches (Claxton, 1988), and for coaches in pre-season and in-season (Lacy & Darst, 1985; Lacy & Goldston, 1990). Moreover, several studies have revealed that the context of the setting has a significant impact on coaching behaviours. Chaumeton and Duda (1988) stated that practices are “designed for players to develop their existing level of skill and to master the techniques of sport” whereas “success in competitive game environments is typically measured relative to normative standards” (p.161). The competitive situation may easily lead to an ego-oriented motivational climate, which is particularly detrimental for athletes with low levels of perceived competence (Chaumeton & Duda, 1988; Ames, 1992a, 1992b). Although by definition a competitive situation involves normative comparison, especially for team sports, athletes might perceive varying levels of task- and ego-involving situational cues emphasised by their coach. Since the aim of the competition is to win, coaches favour the best players in selecting them to participate in the game and represent the whole team. At the end of the game the best players and those who performed better will receive more praise and feedback. Gilbert and Trudel’s (1999) study showed that whereas coach’s focus of instruction was on the entire team in the practices, in game situations the focus of instruction was on individual players. This is consistent with Liukkonen, Laasko and Telama’s (1996) argument that “in a competitive situation, the hardening of the emotional climate may bring about features in the activities of the coaches and young athletes, which are not visible during training” (p.450). Besides, a strong emphasis on an ego-involving climate has been associated with detrimental outcomes for the athletes’ performance and well-being (Kavussanu & Roberts, 1996; Pensgaard, & Roberts, 2000; Walling, Duda, & Chi, 1993). In the present study, it could be assumed that the pattern changed accordingly. In a similar manner, competition situations brought about coach’s discriminative behaviours, thus athletes perceived a more ego-involving motivational climate, in terms of unequal recognition, with the criteria of success focusing on

athletes' performance and not effort and improvement. Ommundsen (1992) emphasised that this can lead to children dropping out of sport.

On the basis of expectancy theory (Horn, 1984; 1985; 1986) Sinclair and Vealey (1989) examined the influence of coaches' expectations about athletes on subsequent feedback given to athletes and found that high expectancy athletes received more specific and evaluative feedback from coaches than low expectancy athletes. It might well be that during the preparation period coaches are beginning to evaluate their athletes on their skill potential early in the season. In the present study, athletes perceived a low to moderate ego-involving motivational climate during the beginning of the season and more particularly a moderate unequal recognition climate operating in their team. After having played several games in the midseason, athletes' performance may conform to coaches' initial expectations and that can trigger more or less coach feedback and attention to these athletes. As a consequence, athletes perceive more unequal treatment from their coach. Their effort and improvement levels drop as they perceive that the coach rewards the players not so much for their effort but for their competitive results. However, this may be expected since it has been repeatedly mentioned that sport competition is an important achievement arena in which competence is publicly demonstrated and socially evaluated from significant others, one of them being the coach (Scanlan & Passer, 1979). Given the context of sport at Loughborough university, it is not unusual that coaches place much emphasis on a "winning is everything" philosophy, sometimes themselves pressured from internal and external sources.

The above results should be considered cautiously. Nicholls (1989) has purported that in a task-involving environment individuals engage in activities for the mere enjoyment of participation and are concerned more with the process of their personal involvement than with competition outcomes. On the other hand, individuals in ego-involving environments are exposed to their coach's pressure to prove their ability relative to others or the individuals will not be recognised by their coach, they will receive punishment and less recognition. These contentions are in accord with previous literature that has shown ego-involving climate to be associated with adaptive outcomes and ego-involving climate to be associated with maladaptive outcomes (Duda, 2001).

Additionally, the present sample, as a group, perceived a highly task-involving climate and a moderate ego-involving climate operating in their teams at the onset of the season. Ommundsen and Roberts (1999) found that ego-oriented situational cues when coupled with task-oriented perceptions of the environment may not elicit maladaptive psychological responses. In addition, Treasure (1997) found that perceptions of a high task coupled with moderate ego climate were linked with high-perceived ability, satisfaction and positive attitudes toward the class. Taking into consideration that the same athletes scored highly as well in the dimensions of closeness, commitment and complementarity, it is safe to assume that adaptive responses would be elicited from the athletes in such a situation. Emphasis of a situational goal structure where both task- and ego-involving cues are perceived by the athletes to be salient and a strong coach-athlete relationship is perceived may be adaptive in the competitive sport setting, as it will help to maintain athletes' motivation.

This study also identified changes in these perceptions in nine-month period; slight decreases in self-perceptions of closeness, commitment and complementarity, meta-perceptions of complementarity coupled with decreases in cooperative learning and effort and improvement and an increase in unequal recognition may not inevitably be detrimental. Hence, with a not steep decrease in the task-involving climate and the coach-athlete relationship and a slight increase of the ego-involving climate, it does not necessarily follow that performance will suffer and that athletes' adaptive responses will be undermined.

The aim of the second step in LGA was to answer the research questions 2a and 2b relating to a) gender differences (*Q2a*) and b) time spent with one's coach (*Q2b*) could predict the initial levels and rates of change in athletes' perceptions of the coach-athlete relationship and the motivational climate.

In relation to the first question, results showed that females perceived higher levels of meta-complementarity than males. Although no previous empirical studies have examined gender differences in meta-perceptions of the coach-athlete relationship, the present finding is similar to previous research with self-perceptions in which females perceived higher levels of closeness, commitment and complementarity (Jowett & Don Carolis, 2004). The two sets of perceptions (self- and meta-) are shown to be very closely linked.

According to Ickes, Gesn and Graham (2000) women are assumed to exhibit greater interpersonal sensitivity and are more empathic than men, thus forming the cultural stereotype of “women’s intuition”. In addition, research by Graham and Ickes (1997) revealed that when women try to infer other people’s thoughts and feelings, this was due to differential motivational rather than differential ability.

Results from gender prediction on the initial status of unequal recognition showed that females perceived lower levels of unequal recognition. This is consistent with findings that males reported higher perceptions of an ego climate (Kavussanu & Roberts, 1996; Miller, Roberts, & Ommundsen, 2004). According to Nicholls (1989), the social environment, which promotes the demonstration of high levels of competence, nurtures a specific dispositional orientation. An athlete who is consistently exposed in an ego-involving climate, where competition and the demonstration of ability compared to others are stressed, they are more prone at developing maladaptive motivational orientations. Conceptually then, the results of this study suggest that males, in comparison to females, consistently perceive a coach-created environment that emphasises performance outcomes and places value on the demonstration of superior ability relative to others. However, this finding should be viewed with caution because males in the present study also perceived a strong task-involving climate in comparison with the ego-involving climate, which in fact was moderate. Duda (1996) has contended that a higher ego-involvement accompanied by a task-involvement is negatively related to enjoyment and affective patterns and positively related to stress, anxiety and attrition. In contrast however, Harwood (2002) explained that a high ego-involvement accompanied by a high task-involvement is beneficial for the athletes.

Time spent with one’s coach was not a strong predictor of growth factors in the variables under investigation. Future research should examine the influence of more time-invariant factors along with the impact of time-varying factors.

The aim of the third step in LGM was to answer the questions 3a, 3b, 3c, and 3d, regarding multivariate relationships between athletes’ perceptions of the coach-athlete relationship and the motivational climate. The results confirmed that there were associations between how the athletes perceived the constructs of closeness, commitment and complementarity in the beginning of the season and their initial perceptions of cooperative learning, effort/improvement and unequal recognition.

Initial status of the elements of the coach-athlete relationship and the motivational climate were related. Results also showed that changes in the constructs of the coach-athlete relationship were related to changes in the constructs of task and ego climate.

Results are in accordance with previous studies in which athletes' high perceptions of task climate and low perceptions of ego climate were found to be associated with positive evaluations of their coach in terms of training and instruction and the provision of social support (Balaguer et al., 2002). A similar pattern was observed in the initial status of the athletes of the present study in the beginning of the season in that athletes perceived high levels of a task climate and low levels of an ego climate and at the same time perceived a strong coach-athlete relationship in terms of high closeness, commitment and complementarity. Thus, the overall climate in the team was positive, reinforcing self-improvement, cooperative actions and mastery goals whereas little emphasis was set on ego goals. This is an optimal climate for the beginning of the season when athletes start training and learning new techniques and skills. The relationship with the coach is being established and both sides perceive each other's intentions, behaviours and cognitions as positive. It might be that in the course of the season, and especially when athletes enter the high competitive season, task goals are de-emphasised and ego goals are more salient. It is the time when unequal recognition predominates since the coach has to make clear who will be selected for the games and who will not. Players start to question their competence in an ego environment and it is possible that the low ability players will perceive a more punitive and unfair coach and their trust, respect, and like for the coach as well as their cooperative interactions will drop. Training sessions become more intense and a focus on performance improvement in order to produce better results is imperative. The athletes' intrinsic motivation might drop giving rise to extrinsic reasons for participating in their sport. Social comparison comes to the forefront as athletes compete more and experience victories and defeats.

Individual variability in self-perceptions of closeness, commitment, complementarity, meta-perceptions of complementarity, as well as cooperative learning, effort/improvement and unequal recognition in the initial status was found, indicating that the athletes' starting point varied substantially from the mean score. No significant individual variability in the rate of change was found in self-perceptions of commitment, meta-perceptions of complementarity, cooperative learning,

effort/improvement and unequal recognition. This finding suggests that either these changes were experienced in the same manner from each athlete or that there is not enough power in the model to reveal significant variances. Significant individual variability in the slope factor was found only for self-perceptions of closeness and complementarity. This suggests that although the entire group of athletes experienced a decrease in perceptions of closeness and complementarity, these changes were not uniform for all the athletes. Thus, the goal of further analysis was to predict this individual variation in the perceptions of closeness and complementarity growth factors. The larger the variance estimates the greater the individual variability in the trajectory parameters (Curran, & Willoughby, 2003).

Interestingly, high self-perceptions of closeness, commitment, complementarity and meta-perceptions of complementarity predicted the rate of change in unequal recognition. Athletes who scored higher in the 3Cs (which were found to drop over time) predicted later decrease of unequal recognition. Athletes who felt that they had a stronger coach-athlete relationship in the beginning of the season perceived that the ego-climate was gradually weakened. These results lend further support to the findings of the first study, wherein a negative association was found between the 3 Cs and the ego-involving climate subscales.

A possible explanation for these findings can be provided by the very popular framework of self-determination theory (Deci & Ryan, 1995, 2000). A main postulate of their theory is the contribution of the social contexts in the satisfaction of athletes' psychological needs of autonomy, competence and relatedness in order for the athletes to maintain their intrinsic motivation and well-being. If social contexts do not provide the necessary conditions for the satisfaction of the athletes' psychological needs then athletes' intrinsic motivation and well being will suffer. This could lead to a vicious cycle in the sense that low intrinsic motivation and maladaptive achievement patterns are very likely to affect perceptions of the social context. If social contexts such as the motivational environment created by the coach and the coach-athlete relationship do not satisfy *all* of the three needs then motivation and well-being are impoverished. Deci and Ryan (2000) declared that "Specifying psychological needs as essential nutrients implies that individuals cannot thrive without satisfying all of them, any more than people can thrive with water but not food." (p. 75). In Jowett and Cockerill's (2003) study with Olympic medallists, a quote from a top level athlete

very clearly demonstrated the contribution of the need satisfaction in their athletic relationship:

“I had a ten-year athletic relationship with coach. In the beginning, we both worked well and got on well... the last three years our relationship worsened and became very typical. I felt he could not provide me with what I needed and wanted.” (p. 325)

Inability to meet the athletes' needs affected the athlete's well-being and performance subsequently affecting the coach-athlete relationship.

Social contexts that satisfy athletes' needs for competence and autonomy might not necessarily satisfy their need for relatedness. Thus, good results that are produced within a highly competitive environment in which perceptions of closeness, commitment and complementarity with the coach are decreasing might enhance athletes' need for competence but not satisfy their need for relatedness. Hence, future studies should concentrate on the mediating mechanisms of the three needs in the prediction of athletes' motivation and other outcomes.

In the present study, it seems that the a certain aspect of the social context, the coach-athlete relationship, was successful in providing the necessary conditions for athletes' need satisfaction and maintenance of their intrinsic motivation, thus influencing their subsequent perceptions of other aspects of the social context (i.e., the motivational climate). Further research is warranted on the examination of the mediating role of need satisfaction in athletes' motivation.

In summary, the univariate latent growth curve models suggested that self-perceptions of closeness, commitment, complementarity, meta-perceptions of complementarity (*Question 1a*) as well as perceptions of cooperative learning and effort/improvement (*Question 1b*) decreased linearly over time. There were also significant individual differences in their initial status and significant individual differences in the rate of growth. Perceptions of the ego climate (*Question 1b*) increased over time and there were significant individual differences in the initial status and rate of change. Further, gender predicted the initial levels of meta-complementarity and unequal recognition (*Question 2a*). Time spent with one's coach was not a strong predictor of changes in perceptions of the motivational climate and the coach-athlete relationship (*Question 2b*). Initial levels in the specific elements in the coach-athlete relationship were related to initial levels of the elements in task- and ego-involving climate (*Question 3a*).

Changes in the specific elements in the coach-athlete relationship were related to changes in the elements in task- and ego-involving climate (*Question 3b*). Overall, this study presented consistent support for the change in athletes' perceptions with regards to their relation with their coach and the climate that he/she promotes, and for the predictive ability of the elements of the coach-athlete relationship towards aspects of the ego-involving climate (*Question 3c*) but not the other way around (*Question 3d*).

Limitations and future recommendations for extensions of the longitudinal study

In conclusion, this study produced an array of significant findings regarding the development of athletes' perceptions in the course of an academic season. Although longitudinal in nature, this study provided evidence of the ability of the three Cs in predicting the rate of change of the ego-involving climate. Future research of an experimental nature is required. By manipulating and controlling for some variables researchers will be more confident to infer causal relationships among the variables under investigation.

Duncan, Duncan, Biglan and Ary, (1998) highlighted some of the limitations of latent growth curve modelling since this technique is inherent in the SEM methodology. The prerequisite for large samples, multivariate normality, equally spaced measures, the assumption that all individuals were assessed at the same time point and that the change is systematically related to the time interval of interest constitute some of the limitations.

The present sample size was not large enough to compare full latent growth models across gender and level of competition or sport. Further research with larger sample sizes is needed to examine potential gender differences in the predictors of growth trajectories. Secondly, longer periods of investigation might shed light on athletes' persistence in sport, and intervention studies that last for more than a nine-month academic season could shed light on the causal relationships between the two variables.

It should be noted at this point that it was not the actual athletic relationship that was examined here; rather the athletes' perceptions of the relationship that determined their views of the social environment created by their coach were investigated. Thus, it might be that the coach created and reinforced one type of climate and the athletes perceived a different one. Future research could possibly examine the actual climate

and the perceived climate and check for levels of agreement on the part of the coach and on the part of the athlete.

The second study has provided important information on the growth and change of athletes' perceptions of the coach-athlete relationship and the motivational climate. Although in the present study two predictors were included in the conditional model, more potential predictors should be identified and measured. Mediation and moderation variables could also be studied that affect the course of change in all these constructs. A longitudinal design could be adopted in the future, which includes more than four time measurement points that will allow for the testing of nonlinear changes in athletes' perceptions of the coach-athlete relationship and the motivational climates.

It would also be very interesting to examine coaches' perceptions of the coach-athlete relationship over time and assess the congruence in their initial levels and rates of change. Lastly, although the present study reported predictive relationships between the three Cs and unequal recognition, experimental and intervention designs are needed that manipulate one of the two variables to shed light on causal relationships.

Furthermore, a common issue of all the SEM methodologies is the size of the sample. Future studies might consider employing larger samples in order to run more complicated longitudinal designs and put more confidence in the results.

In conclusion this study provided significant insights into the stability and change of athletes' perceptions of the motivational climate and the coach-athlete relationship. The findings made a valuable contribution to current theoretical gaps, and call for investigation of athletes' perceptions of the motivational climate and the coach-athlete relationship growth and provided empirical evidence that will help in the promotion of advancements at conceptual, methodological and empirical levels. The boundaries of this study were identified and a number of future research areas were recommended for further thought.

CHAPTER 5

STUDY 3

ASSOCIATIONS BETWEEN PERCEPTIONS OF THE MOTIVATIONAL CLIMATE AND THE COACH-ATHLETE RELATIONSHIP AND COGNITIVE, AFFECTIVE, AND BEHAVIOURAL OUTCOMES.

5 Study 3: Associations between perceptions of the Motivational Climate and the Coach-Athlete Relationship and Cognitive, Affective, and Behavioural outcomes.

5.1 Introduction

Thus far, the first and the second studies established the association between athletes' perceptions of the coach-athlete relationship and perceptions of the coach-created motivational climate at one point in time and over a nine-month period. Firstly, it was shown that the 3 Cs contain features of the task and ego-motivational climate. Athletes that feel closer to their coach, are more committed to their coach over a long period of time, and are more cooperative with their coach are more likely to perceive a social situation in which the coach emphasises learning and mastering of skills, cooperative interactions and feelings of fairness. On the contrary, when athletes experience lower levels of the 3 Cs, they are more likely to perceive a social situation wherein the coach puts emphasis on 'winning at all costs', and favours the best athletes. Secondly, it was shown that some of the 3 Cs and the task- and ego-involving features change linearly over time, while the self-perceptions of the 3 Cs and the meta-perceptions of complementarity can predict later changes in unequal recognition. A logical progression and extension of these studies would be to examine potential influences of these two contextual constructs on several outcomes.

Social contexts and outcome variables. Duda and Balaguer (1999) suggested that athletes who perceive a task-involving motivational climate are more likely to report positive achievement motivational patterns, whereas negative motivation is expected from athletes who perceive an ego-involving climate. These postulations are in accordance with Ames' (1992) suggestions and Nicholls' (1989) theory, as well as the empirical evidence. Perceptions of the motivational climate have been found to predict a number of cognitive, affective and behavioural outcomes at an individual and team level. Empirical evidence within the achievement goal theory literature has shown that social contexts facilitating specific types of goals have different behavioural and affective consequences (e.g., Balaguer, Duda, Atienza & Mayo, 2002; Balaguer, Duda, & Crespo, 1999; Pensgaard & Roberts, 1996; Walling, Duda, & Chi, 1999). Task-involving motivational climate has been positively associated with enjoyment

(Liukkonen et al., 1998; Whitehead et al., 2004), perceptions of success (Ommundsen et al., 1998; Solmon, 1996; Treasure & Roberts, 1998, 2001), self-perceptions (Ebbeck & Becker, 1994), moral functioning (Kavussanu et al., 2002; Miller et al., 2005; Ommundsen et al., 2003), sportspersonship (Gano-Overway et al., 2005; Lemyre et al., 2002), better performance (e.g., Balaguer, Duda, Atienza & Mayo, 2002; Balaguer, Duda, & Crespo, 1999), indices of motivation (Kavussanu & Roberts, 1996; Newton & Duda, 1999; Newton et al., 2000; Seifriz et al., 1992) as well as types of motivation (Ntoumanis, 2002). Ego-involvement was found to thwart intrinsic motivation in achievement domains (Duda & Whitehead, 1998) and was positively related to stress (Ntoumanis & Biddle, 1998b; Pensgaard & Roberts, 1999), performance worry and tension (Kavussanu & Roberts, 1996; Newton & Duda, 1999; Newton et al., 2000; Walling et al., 1993), self-reported boredom (Ntoumanis, 2002); as well as negatively related to performance (Balaguer et al., 2002), enjoyment (Kavussanu & Roberts, 1996), satisfaction and confidence (Halliburton & Weiss, 2002), beliefs that deception leads to success (Treasure & Roberts, 2001), intrinsic motivation (Kavussanu & Roberts, 1996), extrinsic motivation and amotivation (Ntoumanis, 2002), moral reasoning (Miller et al., 2005) and moral atmosphere (Kavussanu et al., 2002).

Based on the findings of the first and second studies undertaken in this thesis that revealed a strong link between perceptions of the motivational climate and the coach-athlete relationship elements, it is logical to assume that a similar pattern of associations to the motivational climate will be identified between the coach-athlete relationship and outcome variables. Furthermore, perceptions of an effective coach-athlete relationship have been positively associated, whereas perceptions of ineffective coach-athlete relationship have been negatively associated with cognitive outcomes, such as group cohesion (Jowett & Chaundy, 2004), and affective outcomes such as satisfaction (Jowett & Ntoumanis, 2004). Accordingly, positive motivational patterns in terms of outcomes such as motivation, anxiety, attitudes, performance, sportspersonship, are expected when athletes perceive an effective coach-athlete relationship, and negative ones in an ineffective coach-athlete relationship (Jowett 2001; Jowett & Chaundy, 2004; Jowett & Cockerill, 2002).

Although, strong empirical evidence showed that motivational climate and coach-athlete relationship perceptions might impact on various outcomes, the body of

literature examining the mechanisms through which such influences take place is very limited. Achievement goal theory research thus far has identified that perceptions of the motivational climate might influence perceptions of competence and the interaction between the two constructs might be able to predict various outcomes (Dunn, 2000; Kavussanu & Roberts, 1996; Liukkonen, Telama, & Biddle, 1998; Newton & Duda, 1999; Pensgaard & Roberts, 2000; Reinboth, Duda, & Ntoumanis, 2004; Standage, Duda, & Ntoumanis, 2003; Thill & Brunel, 1995; Treasure, 1997; Whitehead, Andrée, & Lee, 2004). Nevertheless, these studies have not identified the mediating role of competence/ability perceptions in the relationship between motivational climate and outcome variables. They have rather approached the construct of perceived competence/ability as a moderating factor on motivational climate's influence on outcomes, conducting 2 x 2 ANOVA (e.g., Thill & Brunel, 1995), profile group (e.g., Whitehead et al., 2004) canonical correlation (e.g., Treasure, 1997), and/or moderated hierarchical regression analyses (e.g., Standage et al., 2003). Only recently, a small number of attempts have been conducted to explain these processes through mediating mechanisms (Reinboth, Duda, & Ntoumanis, 2004). These studies have followed Duda's (2001) propositions that further investigations are required to consolidate achievement goal theories with other frameworks and areas in sport psychology, in order to gain a fuller understanding of the athlete's sporting experience. One area of motivation closely associated with achievement goal theory, which specifically examines the role of the social contexts and the mediating mechanisms through which they influence outcome variables is self-determination theory. Ntoumanis (2001) explicated the theoretical areas of convergence between the two theories and proposed that their amalgamation could be the way forward to the study of motivation. A brief introduction to the tenets of Self-determination theory is necessary at this point, before a description and comparison between the two theories is presented and an explanation of why their integration will help to better understand athletes' achievement behaviour.

5.1.1 Self-Determination Theory

The basic and underlying assumption of Self-Determination Theory (SDT) is that human behaviour is inherently self-motivated. SDT emanated from the work of Edward Deci and Richard Ryan, who examined human motivation and how people develop and function in social contexts. Deci and Ryan (1985, 2000) adopted an

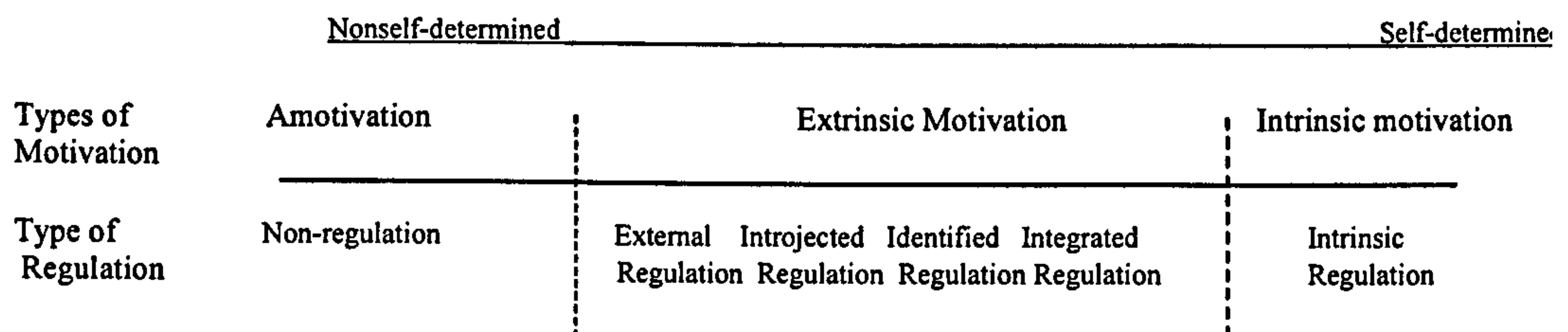
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organismic approach to achievement motivation and more generally intentional behaviour, differentiating intention from choice or volition. Their main postulate is that human behaviour is volitional and self-determined in varying degrees influencing therefore, their subsequent behaviour and well-being. Individuals that are autonomous or self-determined, experience themselves as initiators of their own actions and achievement behaviour. Individuals, on the other hand, that are less autonomous or self-determined and more controlled, and may act and behave intentionally, but not out of their own choice.

According to Deci and Ryan's organismic theory, individuals become more or less self-determined on the basis of the regulatory mechanisms they use to internalise and integrate events, ideas, interests, and values that are external to their social world, into their selves. These processes are internal tendencies and fundamental aspects of people's lives that determine their actions and help them operate more effectively. The processes of internalisation and integration are described as the processes through which the external behaviour approaches more internal levels, or in Deci and Ryan's (1985) own words, when "one distinguishes specific elements of one's internal and external environments and then brings those elements into harmony with one's existing structures, thereby elaborating and refining the structures." (p. 114).

The degree of internalisation and integration that characterises an individual will determine, as mentioned above, their level of self-determined motivation. Deci and Ryan argued that self-determination lies on a continuum with self-determined motivation being at the one end of the continuum (intrinsic motivation), progressing to less self-determined (external regulation, introjected regulation, identified regulation, integrated regulation) and resulting in nonself-determined motivation (amotivation).

The different types of motivation are illustrated in Figure 13.

Figure 13: The self-determination continuum.

Deci (1975) postulated that intrinsic, extrinsic and amotivation are not single constructs, but consist of more specific motives. The different types of motivation lie in the continuum according to the inherent level of self-determination. These stages of extrinsic to intrinsic motivation reflect the processes through which such non intrinsically motivated behaviours can become truly self-determined; in other words, the different types of motivation refer to different degrees to which the value and regulation of the requested behaviour have been internalised and integrated into one's self.

For these internalisation and integration processes to take place, the effective function of their nutrients is required. According to Self-determination theory these nutrients are the individuals' basic psychological needs. The incorporation of the construct of innate psychological needs served "as the basis for integrating the differentiations of goal contents and regulatory processes and the predictions that resulted from those differentiations" (Deci & Ryan, 2000, p.227).

The concept of needs has been studied, within the SDT framework, through the basic needs theory (BNT; Ryan & Deci, 2000b). The content and types of goals has been studied by achievement goal theorists in the form of the distinction between task- and ego-involving goals (Ames, 1992; Dweck, 1986; Nicholls, 1989). SDT advanced the study of achievement motivation by incorporating the regulatory processes through which outcomes are pursued, and by specifying the necessary nutrients for these regulatory processes. In addition, Ryan and Deci (2000a) noted that "Specifying psychological needs as essential nutrients implies that individuals cannot thrive without satisfying all of them, any more than people thrive without with water but not food. (p. 75).

Ryan and Deci (2000b) conceptualised and clarified the meaning and influence of the concept of needs in an attempt to predict what are the driving forces that lead people to adopt specific goals and outcomes. Deci and Ryan (2000) argued that people through the adoption of a specific goal try to satisfy their innate needs of autonomy, competence and relatedness. It is these needs that colour the goals, give them meaning and decide which regulatory processes will be adopted to satisfy these needs and determine their behaviour.

Within the SDT, three innate psychological needs are considered to mediate the effects of the social contexts and individual differences on the different types of motivation (Deci & Ryan, 2000). The satisfaction of these psychological needs is the primary energiser of one's developmental process. Ryan and Deci comply with Hull's (1943) definition of what constitutes a need, whether physiological or psychological that is an energising state that if satisfied conduces toward health and well-being and if not satisfied contributes to psychopathology and ill-being. However, these needs are not physiological neither acquired, but psychological and innate. They explicitly distinguish between needs and desires. Both of these constructs motivate and drive behaviour; however a need is associated with well-being and healthy functioning, while a desire if not satisfied might not always be associated with well-being. For example the need for efficacy relative to achieving wealth and fame, when not satisfied was found to correlate to ill-being, thus was categorised more as an extrinsic motivator rather than an innate psychological need (Kasser & Ryan, 1996).

The first need identified by Deci and Ryan, is the need for competence, referring to the fundamental need to feel effective after engaging in optimal challenges in the physical and social domain. The second need, that is the need for relatedness, refers to an individual's need to experience attachment and security, as well as safety in a relationship. Finally, the need for autonomy includes the self-regulation of one's behaviour in order to meet one's goals and the feeling that one is in control of his/her own behaviour and that it does not emanate from external sources. An overview of the empirical evidence to support the existence of the three needs and their impact on athletes' motivation and well-being has been provided by Deci and Ryan (2000), and Ryan (1995).

In brief, SDT proposes that social contexts (such as the context created by significant others like the teacher or coach) and individual differences that provide the necessary

conditions for the satisfaction of the innate psychological needs lead to the enhancement of intrinsically motivated behaviour, facilitate the processes of internalisation and integration, and promote general well being. On the other hand, when these needs are hindered or placed in dynamic opposition by for example a controlling environment, then well-being will suffer and antisocial behaviours might substitute intrinsically motivated and integrated behaviours (Ryan, 1998).

Social contexts in sport settings are examined by the degree to which they promote autonomy or control, whereas the need for competence is the most widely studied need. Blanchard and Vallerand (1996) examined the relationship of needs, different types of motivation, and coach's interacting style in basketball players. They found that the athletes felt more autonomous, competent and related to their team when they perceived that their coach was promoting an autonomy-supportive style. Higher perceptions of autonomy, relatedness and competence were associated with more intrinsic motivation. Similar findings with respect to autonomy have been reported from other studies (Goudas, Biddle, & Underwood, 1995; Kowal & Fortier, 2000; Markland & Hardy, 1997) as well as to relatedness (Blanchard & Vallerand, 1996).

A recent study by Gagné, Ryan, and Bargmann (2003) examined the effects of young female gymnasts' perceptions of their coach's support on the satisfaction of their basic psychological needs for competence, autonomy and relatedness, motivation and well-being. Hierarchical linear modelling analysis revealed that the more autonomy-supportive the coach was the more autonomously motivated the gymnasts were. It was also shown that daily motivation predicted pre-practice well-being, which was measured in terms of negative and positive affect, and subjective vitality. Changes in well-being from pre- to post-practice varied systematically with the need satisfaction experienced during practice.

Autonomy-supportive and controlling environments entail "a complex set of behaviours that goes beyond simply providing choice" (Mageau & Vallerand, 2003, pp. 891-892). One of the characteristics of controlling environments is manifested through the promotion of ego-involvement. Therefore, one of the forms that coach's controlling behaviours take is evident in the creation of an ego-involving situation (Mageau & Vallerand, 2003). Frederick and Ryan (1995) asserted that in states of ego-involvement, athletes might feel pressured to achieve certain outcomes in order to maintain their levels of self-esteem. Ryan (1982) explains that in an ego-involvement

state individuals' self-esteem is hinged upon performance, thus leading to an internal pressure to support self-esteem that is similar to external sources. This ego-involving state represents an internally controlling input, inversely associated with intrinsic motivation. According to Self-determination theory, and more specifically, cognitive evaluation theory (i.e., a subtheory of SDT), controlling events undermine intrinsic motivation, because they tend to direct and control behaviour in certain ways and affect the need for autonomy and competence (Ryan & Deci, 2000c). On the other hand, events that are informational, that is they provide positive feedback in an autonomy-supportive manner, tend to enhance and promote intrinsic motivation, and greater engagement in the activity at hand (Deci, 1975; Ryan, 1982).

Additionally to the study of the social context in terms of autonomous versus controlling coaching behaviours and in light of the previous propositions on the states of involvement influencing self-determination, more recent studies have incorporated facets of the coach-created motivational climate as social factors influencing athletes' self-determination. Ryan and Deci (2000b) argued that there is sufficient empirical evidence to suggest that "competition, contingent evaluation, ego involvement, and related phenomena, in which social comparison figures heavily often yield quite negative affects and impoverished forms of motivation" (p. 323).

An attempt has been made recently to examine simultaneously all three needs as mediators in the relationship between social factors and different types of motivation by Standage, Duda, and Ntoumanis (2003). Structural equation modelling results showed that when athletes perceived an autonomy-supportive and task-involving climate their needs for autonomy, relatedness and competence were satisfied leading to self-determined motivation. It was also revealed that self-determined motivation yielded adaptive motivational responses. These results were complemented by a qualitative study led by Hassandra, Goudas, and Chroni (2003) with sixteen students who underwent in-depth interviews. Analysis revealed that both environmental factors and individual differences affected students' intrinsic motivation. Among the individual differences perceptions of perceived competence, perceived autonomy, physical appearance, and goal orientation prevailed. Social factors included lesson content, the PE teacher, classmates, athletic facilities, family encouragement, media, cultural values, and social preconceptions. Summarising the above results, it is shown that although individuals enter the sport and exercise context to seek out activities,

have fun, interact with their peers, enhance their skills and athletic performance, several external and internal pressures are perceived to put pressure on the participants. Since many athletes reported greater intrinsic motivation and enjoyment when their coach or teacher emphasised choice and autonomy supportive behaviours, it is evident that these environments facilitate the satisfaction of the basic needs.

Ntoumanis (2001) examined the mediating role of the three needs in the relationship between certain facets of the social context on indices of motivation and in turn on several outcomes. Ntoumanis examined two aspects of the task-involving motivational climate, namely cooperative learning and improvement as they were created by the coach/PE teacher. All three needs strongly related to social factors but competence was the stronger predictor of motivation indices. Other studies that have looked at the mediating role of the three needs and indices of motivation in the relationship between motivational climate and differential outcomes such as flow and intention to partake in leisure time physical activity provided similar results to support the mediational role of the three needs (Kowal & Fortier, 2000; Standage Duda, & Ntoumanis, 2003). Another study by Sarrazin, Vallerand, Guillet, Pelletier, and Cury (2002) examined both facets of the motivational climate and their influence on athletes' need satisfaction and drop out. Results revealed that task-involving climates (contrasted with ego-involving climates) promoted need satisfaction and negatively predicted drop-out in adolescent handballers.

Reinboth, Duda, and Ntoumanis (2004) examined the mediating role of competence, autonomy, and relatedness in the relationship of social contexts initiated by the coach and well being outcomes. Facets of the social context included coach-autonomy support, social support and improvement with the latter being part of the motivational climate that the coach reinforces in the team. Structural equation analysis results showed that both autonomy supportive and task-involving aspects of the environment conducted in the satisfaction of the needs of autonomy and competence, respectively. The general satisfaction of the needs enhanced in turn, the athletes' subjective vitality and intrinsic satisfaction, providing further evidence of the different facets of the social context on need satisfaction and psychological welfare.

Although no empirical evidence exists for the influence of perceptions of the coach-athlete relationship on the psychological needs, Reinboth, et al. (2004) found that social support provided by the coach influenced perceptions of relatedness within the

team. Although the concepts of social support and coach-athlete relationship are not identical certain commonalities can be drawn. Social support in Reinboth et al.'s study was measured through the Social Support Questionnaire (SSQ6; Sarason, Sarason, Shearin, & Pierce, 1987). The SSQ6 taps more the subjective rather than the objective degree of social support and the definition is similar to the one used in the development of the LSS (Chelladurai & Saleh, 1978, 1980). Social support in the latter questionnaire was defined in terms of the coach's concern for the welfare of the athlete, positive group atmosphere, and warm interpersonal relationships with the players in the team. In an attempt to compare the concepts of social support and the coach-athlete relationship as it is operationalised by the 3 Cs, the following similarities are evident. More specifically, the closeness element of the coach-athlete relationship refers to feelings of like, trust and respect (Jowett, 2001; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004), whereas social support refers to feelings of being loved, valued and esteemed by the coach (Pierce, Sarason, & Sarason, 1992), or affection, care, trust and friendly behaviour (Chelladurai & Saleh, 1980). These definitions of both concepts refer to the emotional element of the social environment involving the coach and the athlete, as well as to friendly and cooperative interactions.

Drawing from the results reported by Reinboth et al. (2004), that social support satisfied athletes' need for relatedness, it can be assumed that the relationship formed between the coach and the athletes will satisfy their need for relatedness. It was suggested that when the athletes perceived that their coach provided assistance and emotional support, they also perceived that their need for relatedness with their teammates was satisfied. Similarly, in an effective coach-athlete relationship, where high levels of closeness, commitment and complementarity are perceived, athletes are expected to perceive high levels of care and affection on the part of the coach as well as receive assistance from the coach, resulting in the satisfaction of their need for relatedness. Additionally, in coach-athlete relationships that are marked by high levels of closeness, commitment and complementarity, and where the coach cares genuinely for his/her athletes, it is expected that the coach will help in the facilitation of his/her athletes' performance enhancement. Thus, it is expected that the coach will create such conditions that will contribute to the satisfaction of the athletes' need for competence.

Finally, effective coach-athlete relationships are expected to promote the satisfaction of the need for autonomy. Standage et al. (2003) showed that mastery (task-involving) climates promote the need for autonomy. Climates that reinforce learning and personal improvement, support self-referenced competence, and beliefs that effort lead to success, instil and satisfy the need for autonomy, as athletes investing more effort, feel that they are in greater control over their achievement (Treasure & Roberts, 2001). In effective coach-athlete relationships, and particularly when the athletes and the coach are highly committed and share common goals, it is expected that the athlete will feel more autonomous and in control of their training and personal development.

5.1.2 Towards an Integration of Theories

All the above research, investigating athletes' motivation and well-being utilising simultaneously AGT and SDT serves to explain why an integration of social cognitive theories would help better explain the links between social contexts, mediating variables, motivation and numerous cognitive, affective and behavioural outcomes (Duda, 2001; Mallet & Hanrahan, 2004). Ntoumanis (2001) argued that empirical links can be drawn between the two theories. He stated that "Goal achievement theory and self-determination theory share certain characteristics. Briefly, both are social cognitive theories of motivation which emphasise the notion that the way individuals construe the meaning of an activity will influence the quality of their engagement in it" (p.400). He continues by supporting the idea of the two theories complementing each other. In both theories, social contexts are assumed to predict achievement-related behaviour. Contexts do not only include autonomy versus controlling coach's behaviours, but also the overall motivational climate created by the coach and the relationships formed between the coach and the athletes. All these aspects of the social environment hold the potential to satisfy or forestall the satisfaction of the athletes' psychological needs.

The concept of ability or competence is central to both AGT and SDT theories. Dweck (1986) and Nicholls (1984) argued that individuals' ultimate goal for engaging in achievement contexts is the demonstration of ability. This tenet is in agreement with Deci and Ryan's (1985, 2000) Cognitive Evaluation Theory, a mini theory of SDT, in which they proposed that individuals need to demonstrate competence. Thus, the perception of ability is a critical factor in both, SDT and AGT in interpreting

achievement behaviour, but in the former context ability is conceptualised as a need, whereas in the latter as a more or less differentiated conception of it. Moreover, a focus solely on perceptions of ability as mediators in the prediction of numerous outcomes maybe somewhat limiting, while SDT provides a wider viewpoint including the concept of choice and volition through the need for autonomy and the concept of affiliation through the need for relatedness as other possible mediating variables.

Deci and Ryan (2000) agreed with Nicholls' (1984) concept of task-involvement as bearing many similarities with intrinsic motivation. Ego-involvement could be conceptualised as a type of extrinsic motivation. Extrinsic motivation though has different degrees of internalisation processes and the association between ego-involvement with each of them has not yet been explicitly identified. The higher the levels of internalisation and integration of extrinsic motivation the more positive the consequences for the individual (e.g., well-being) will be. According to Deci and Ryan (2000) ego-involvement refers to introjected regulation, which is one of the types of extrinsic motivation. They explained that introjected regulation involves a partial internalisation process, in which regulations have not fully become a part of the person's self. However, it is also possible that ego-involvement can be initiated by other types of motivation. Ntoumanis (2001) argued that task orientation on the other hand, can fulfil one or more of the three basic psychological needs, thus enhancing intrinsic/self-determined motivation. Ego orientation followed by low levels of perceived competence is not conducive to the satisfaction of these needs.

Furthermore, although the proposed model of motivation and coach-athlete relationship that was presented at Chapter II, p. 91, serving as an extension to Duda and Balaguer's (1999) model, is sufficient in identifying the situational variables contributing to the prediction of various motivational patterns, it does not sufficiently explain the mechanisms through which this influence takes place. Thus, it seemed appropriate to integrate achievement goal theory into the wider framework of self-determination theory, as the consideration of needs will be able to provide a wider explanation on why athletes pursue specific types of goals and why they perceive task- or ego-involving situations. Another reason conducing to the integration of theories is because achievement goal theory is focused on performance and achievement, an integration of the three needs suggested by self-determination theory

with regards to the relationship between the coach and the athlete will shed light on relationship goals specific to sport.

Having established a link among achievement goal theory (AGT), self-determination theory (SDT) and the coach –athlete conceptualisation (3+1 Cs), as well as due to a recent tendency of integrating motivational theories to complement each other in the description and explanation of athlete's behaviour (Mallett & Hanrahan, 2004), Study 3 also seeks to explain the impact of situational factors on several outcomes through an amalgamation of theories. SDT can shed some light into the potential implications of different aspects of the social environment in the context of sport.

Through their participation in sport, athletes seek to satisfy the basic needs of autonomy, competence and relatedness. The concept of needs and the satisfaction of *all* of them have only been recently given attention in the sporting context. It is suggested here, that it is the specific context of the motivational climate and the coach-athlete relationship that will provide the satisfaction of the three needs. Hodgins, Koestner, and Duncan (1996) found that autonomy as a general orientation and as an individual difference, was more associated with positive and satisfying personal relationships, showing as well that autonomy and relatedness are not incompatible needs, and can be both satisfied.

In the same line, the social contextual factors that provide opportunities to satisfy these basic needs will promote learning and will have positive effects on self-regulation. In other words, it is assumed that contexts that promote task-involvement and high levels of closeness, commitment, and complementarity will support autonomy, competence and relatedness will enhance intrinsic motivation and optimal functioning. Following Ryan's (1995) contention "Domains and situations in which individuals find their basic psychological needs supported will be those in which integrative processes will be most evident, and in which persons will tend to experience the greatest well-being and satisfaction" (pp.411-412), this study through three sub-studies aimed to look at the satisfaction of the three needs in the social context of the coach-athlete relationship and motivational climate created by the coach and its impact on motivation, role ambiguity, athletes' satisfaction with personal treatment, and subjective performance.

It should be noted at this point, that the needs explored as a main variable in this thesis, pertain to the need to feel autonomous, competent and related to the coach and in the presence of the coach. These needs are relationship needs and refer explicitly to the athletic relationship between the athlete and the coach. This clarification was necessary to distinguish the needs used in other studies. For example the relationship need has been used to describe the relationship between the athlete and the team or PE class (Reinboth et al., 2004; Standage et al., 2003).

The need for competence has been used to describe the athlete's intrinsic competence irrespective of the context of the relationship (Reinboth et al., 2004; Standage et al., 2003). In these studies, athletes rated themselves in relation to how good they felt at the activity or sport at hand. In the present study, athletes respond to how competent they feel as athletes in the relationship with their coach.

Finally, the need for autonomy has been measured in terms of how autonomous the athletes feel within their team or PE class (Reinboth et al., 2004; Standage et al., 2003). In the present study, the need for autonomy refers to the specific relationship with the coach, that is, how autonomous the athlete feels within the coach-athlete relationship.

Moreover, the selection of the outcome variables studied in the present thesis, was based on a synthesis of theoretical suggestions from both AGT and SDT. In Duda and Balaguer's model (1999) social contexts (i.e., motivational climate) are thought to influence a number of cognitive (e.g., beliefs about the causes of success persistence, role ambiguity/clarity), affective (e.g., enjoyment, individual and team satisfaction, stress) and behavioural (e.g., objective and subjective performance, persistence) responses at the individual and team level. Among these outcomes satisfaction, enjoyment and stress relate to well-being as it is conceptualised in Deci and Ryan's (1985, 2000) SDT.

Ryan and Deci (2000b, 2001) viewed well-being from an eudaimonic approach firstly developed by Rogers (1963) in terms of a fully functioning person. They stated that well-being can be assessed as "the presence of vitality and self-actualisation and the absence of anxiety, depression, and somatic symptoms" (Ryan & Deci, 2000, p. 323) and elsewhere as the "optimal psychological functioning and experience" (Ryan & Deci, 2001, p.142). They also posit that well-being is a multifaceted concept and

satisfaction and happiness as well as positive and negative affect are typically measures of subjective well-being and that subjective well-being constitutes only one of several indicators of psychological well-being. Therefore, because research has shown that conditions fostering subjective well-being do not necessarily foster psychological or eudaimonic well-being (Nix, Ryan, Manly, & Deci, 1999), self-actualisation, vitality and mental health assessments were used by SDT researchers to supplement the subjective well-being measures. In the sporting context researchers have used subjective vitality, intrinsic satisfaction with and interest in sport, physical symptoms (Reinboth, Duda, & Ntoumanis, 2004), positive and negative affect, self-esteem (Gagné, Ryan, & Bargmann, 2003), intentions to partake in physical activity (Standage, Duda, & Ntoumanis, 2003) and flow (Kowal & Fortier, 2000) as indicators of the athlete's well-being.

According to SDT, the fulfilment of the basic psychological needs within social contexts, aims at psychological growth (e.g., intrinsic motivation), integrity (e.g., internalisation and assimilation of cultural practices), and fosters life satisfaction, positive and negative affect, psychological health, experiences of vitality and self-congruence. In the present study, psychological growth was directly measured through the employment of intrinsic and extrinsic measures of motivation, whereas, well-being was indirectly measured, through the employment of the constructs of role ambiguity/clarity, satisfaction and subjective performance. The outcome of satisfaction and performance were chosen in order to address the hedonistic and eudaimonic aspects of well-being. Hedonistic, because satisfaction was measured in terms of satisfaction with personal treatment from the coach and individual and team performance and not in terms of intrinsic satisfaction and interest with the sport. Eudaimonic, because performance was measured not only in terms of subjectively rating performance in the tactical and technical aspects of their game, but in terms of experienced flow during the game. The outcome of role ambiguity although does not address directly athletes' well-being, is closely related as an antecedent. Thus, it was hypothesised that athletes who felt clear and unambiguous about their roles in their teams, were satisfied with the personal treatment from their coach, and felt that themselves and their team had performed well, would have satisfied their basic needs resulting in feelings of psychological wellness and optimal functioning.

Therein, lay the two main purposes of the final study of this thesis. Study 3 attempts to investigate variations in optimal functioning in terms of individual and/or team cognitive, affective and behavioural motivational patterns that result as a function of perceptions of the situational goal structure and the coach-athlete relationship on the satisfaction of the basic needs.

Specifically, three sub-studies were undertaken to explore each outcome separately. This decision was due to the main aim of the third study which was the examination of the associations among the motivational climate and the coach-athlete relationship, need satisfaction and several outcome variables (e.g., motivation, satisfaction). Sport psychology literature has already evidenced a positive pattern of results between task-involving features and adaptive outcomes, as well as a negative pattern of results between ego-involving features and maladaptive outcomes. Associations between the coach-athlete relationship and outcome variables have not been reported yet—especially since Jowett and colleagues' conceptualisation is recent. Based on the results of the first study (i.e., showing associations between motivational climate and the coach-athlete relationship) it was hypothesised that the coach-athlete relationship would be associated in the same pattern to the motivational climate with outcome variables. These results would be clearer when produced by a model including each independent variable separately. The reason for this is that Study 1 showed the motivational climate and the coach-athlete relationship to be highly correlated. Thus, entering both variables in the same model would blur the results.

Thus, to keep the models simple the research aims of the second and third studies are as follows:

- Study 3a: To examine the impact of the social context of the coach-athlete relationship and motivational climate as well as the mediating role of need satisfaction on the adoption of a more or less self-determined type of motivation.
- Study 3b: To examine the impact of the social context of the coach-athlete relationship and motivational climate as well as the mediating role of need satisfaction on perceptions of role ambiguity.
- Study 3c: To examine the impact of the social context of the coach-athlete relationship and motivational climate as well as the mediating role of need satisfaction on perceived satisfaction and performance.

5.2 Study 3A: Social Contexts and Motivation: The Mediating Role of Need Satisfaction

5.2.1 Introduction

Motivation has been characterised as the cornerstone in the science of human behaviour (Ryan, 1998), the primary objective and a key factor in explaining cognitions, emotions and achievement behaviour (Ntoumanis & Blaymires, 2003; Ommundsen, 2001), and as a central issue in human affairs (Roberts, 1992). Ryan and Deci (2000a) explicated clearly and summarised the importance of motivation:

“Motivation concerns energy, direction, persistence and equifinality - all aspects of activation and intention. Motivation has been a central and perennial issue in the field of psychology, for it is at the core of biological, cognitive, and social regulation. Perhaps more important, in the real world, motivation is highly valued because of its consequences: Motivation produces. It is therefore of preeminent concern to those in roles such as manager, teacher, religious leader, coach, health care provider, and parent that involve mobilizing others to act” (p. 69).

Motivation has therefore, received a substantial amount of attention in sport and exercise psychology, and especially within the achievement goal theory framework. Gill (2000) explains that for over than 20 years the research tradition focusing on examining intrinsic motivation in sports has used a conceptualisation of intrinsic motivation as a multidimensional construct comprising a number of indices such as enjoyment, effort, interest, and competence. Extrinsic motivation and amotivation have received very little attention. The prevailing framework in the study of intrinsic motivation has been through Cognitive Evaluation Theory (CET; Deci & Ryan, 1980, 1985, 1991).

5.2.1.1 Cognitive Evaluation Theory in Sport

As it was discussed earlier, cognitive evaluation theory concerns the study of intrinsic motivation and the factors that facilitate or undermine its expression (Deci & Ryan, 1980, 1985, 1991). Specifically, it investigates the role of the social contexts in predicting intrinsic motivation. According to the theory, inputs from events or contexts relevant to the initiation and regulation of behaviour can serve to promote or obstruct self-determination and facilitate or hinder competence. When feelings of

competence are satisfied then intrinsic motivation is enhanced and promoted. The thwarting of competence results in diminishing intrinsic motivation.

Another key variable within this mini-theory of motivation is the mediating role of autonomy or self-determination in the relationship between social factors and intrinsic motivation. While sport participation is/can be voluntary and autonomous as well as intrinsically motivated at the first place, it also constitutes “an arena in which pressures, expectations, performance goals, and rewards are often salient” (Frederick & Ryan, 1995, p. 9). Ego-involvement can be quite outstanding and is often promoted by social factors in sport and adopted by the participants by often basing their self-image and their self-worth on their performance and success. Especially, organised sports contain a number of extrinsic components (Vallerand, Deci, & Ryan, 1987), such as rewards, trophies, instant fame, and money. A number of social pressures are put upon the athlete from coaches, parents, officials, and the media. But not all athletes are involved in sport for extrinsic reasons, and to verify their self-worth and exhibit higher competence. Intrinsic reasons for sport participation have been reported by numerous researchers with specific references to gender differences, such as females reporting more intrinsic reasons for participating in sport than males (Gill, Gross, & Huddleston, 1983; Wankel & Kreisel, 1985).

Moreover, Deci and Ryan argue for the functional significance or psychological meaning that inputs (e.g., feedback, rewards, praise, criticism) relevant to the activity can have. These inputs can be external events (e.g., reward, praise), internal (e.g., ego involvement), and general contexts (e.g., team climate) and are perceived as informational, controlling or amotivating. The informational side of an input or event or social context refers to effectance relevant inputs. Inputs from rewards, praise, feedback, events that increase feelings of self-worth and competence, facilitate intrinsic motivation, while inputs that provide information to decrease the feelings of self-competence and self-determination decrease intrinsic motivation.

The controlling aspect of a reward, input structure, praise, or feedback refers to the control or direction of performance or behaviour. People who are intrinsically motivated to engage in an activity or sport have the cause of participation residing within them. However, the introduction of extrinsic rewards can change their perceived locus of causality. An athlete initially participating for the mere enjoyment and love of the sport, by receiving rewards, money, feedback or fame, can easily

change his/her locus of causality by participating only for the rewards, thus not enjoying the sport any more, but deriving pleasure and satisfaction from medals, fame, and money.

The amotivating aspect of an event refers to feelings of incompetence and ineffectance thus leading the athlete to experience feelings of helplessness and minimisation of his/her intrinsic motivation. Depending on which aspect of an event or input is more salient the effects on motivation and behaviour will vary. Once the informational aspect is more salient, and the information provided is positive thus, enhancing feelings of competence then rewards can enhance intrinsic motivation. In the case of a more salient informational aspect that conveys negative information about one's competence and of a more controlling aspect, rewards serve to decrease intrinsic information.

Several studies have looked at the influence of several components of cognitive evaluation. A few indicative studies will be selected to represent the main findings in only one of the elements touched by the CET, namely the influence of social factors and more specifically sport contexts on motivation and competence.

The impact on intrinsic motivation of the coach's behaviours and the climate has been studied in relation to sport contexts. Deci and Ryan (1987) have suggested that individuals in a leadership/supervisory position (teachers, coaches, parents) influence subordinates' motivation through their behaviour that can be perceived as controlling or autonomy-supportive. If a coach interacts with his/her athletes in a controlling manner the athletes' autonomy will suffer and their intrinsic motivation in turn will diminish. Pelletier, Fortier, Vallerand and Brière (1998) in a study with university swimmers found that a coach's controlling style was related with lower intrinsic motivation reported by the university swimmers, whereas coaches who favoured an autonomy supportive approach had more intrinsically motivated swimmers.

Another social factor identified by sport researchers, likely to influence motivation, is the motivational climate in a team as it is created by the coach. Kavussanu & Roberts (1996) found that perceptions of task-involving motivational climate were associated with higher levels of intrinsic motivation than perceptions of ego-involving climate. The impact of motivational climate on indices of intrinsic motivation was reviewed in the literature review (see pp. 33-36).

Measurement of intrinsic motivation in sport has typically been conducted with the use of the Intrinsic Motivation Inventory (IMI; Ryan, 1982), which was adopted for sport and the physical domain by McAuley and his colleagues (McAuley & Duncan, 1989; McAuley, Duncan, & Tammen, 1989; McAuley & Tammen, 1989). The IMI is a 27-item self-report measure of intrinsic motivation comprising five subscales: Interest/Enjoyment (e.g., “I enjoy participating in this sport very much”), Pressure/Tension (e.g., “I feel very tense while participating in this sport”), Perceived Competence (e.g., “I think I am pretty good at this sport”), Effort/Importance (e.g., “I put a lot of effort into this sport”), and Choice (e.g., “I participate in this sport because I have no other choice”). Adequate reliability and validity was reported for four of the five subscales resulting in the dropping out of the Choice subscale. The IMI received criticism of not reflecting accurately the tenets of cognitive evaluation theory (Markland & Hardy, 1997). It has severely criticised as well for measuring antecedents and outcomes of motivation rather than measuring motivation itself (Ntoumanis, 2001). Vallerand and Fortier (1998) highlighted certain issues associated with the IMI and other measurement instruments used to assess intrinsic motivation in sport, relative to their poor factorial validity, internal reliability and their level of generality.

Due to conceptual and measurement issues, the study of motivation has been better explained by SDT, by conceptualising motivation as a multidimensional construct, and incorporating all three needs as essential nutrients for self-determined motivation. A brief introduction follows to the study of sport motivation within the SDT framework.

5.2.1.2 Self-Determination Theory in Sport

Recently, a tendency has been evident in integrating theories of motivation to complement each other in the prediction and explanation of achievement behaviour in sport. Along with this new trend, a different conceptualisation of motivation has been adopted emanating from Deci and Ryan's (1985, 2000) SDT. Motivation has been conceptualised as a multidimensional construct, not comprising different manifestations but rather different types of motivation. These different types are determined according to the regulatory mechanisms used in each type and how much individuals have internalised the values, regulations, and reasons why they engage in

an activity or sport. The two regulatory mechanisms that are identified by Ryan and Deci (2000) are the internalisation of a behaviour, namely the degree to which people have “taken in” a value or a regulation and the integration that refers to the transformation of the value or reason, or regulation into the self so that eventually it will emanate from their sense of self. Thus, extrinsic motivation consists of four types: external, introjected, identified and integrated motivation, which reflect the different regulatory styles used in each one. All forms of external regulation are situated in the middle of the continuum ranging in the degree of autonomy that the individual perceives. Athletes participating in sports will be externally regulated when their behaviour is controlled by external rewards or threats. Individuals engage in a sport due to external forces. An example of an athlete who is externally regulated can be illustrated by the following “OK! I will go to practice if I really must”. Introjected regulation can be identified in individuals who have internalised initially the reasons for acting, for engaging in this activity, but because this activity was not truly self-determined and initially volitional, individuals put pressure on themselves to engage in this activity. Individuals who fall in this category would be more likely to say “I will feel guilty if I don’t practice today”. They engage in the activity in order to avoid negative feelings such as guilt, shame or in order to seek approval from others for their performance. The next type of motivation is termed identified regulation and refers to the process of engaging in the activity out of recognition of the activity. The individual recognises the underlying value of the activity and its importance for his/her personal development, thus, internalising fully its regulation. An example from an individual being regulated by this type of motivation would be “I want to practice hard to improve my skills in my sport”. The last type of extrinsic motivation is volitional and is in harmony with other aspects of the individual’s self, thus it is volitional and self-determined. It is a more full and complete form of regulation. The person has accepted and integrated the behaviours and activities into the self. An example from an individual being regulated by this type of motivation would be “I engage in my sport because it is important to me and represents who and what I am”.

In response to the previous criticisms of the IMI as a measurement tool of intrinsic motivation, Pelletier et al. (1995) developed the Sport Motivation Scale (SMS) and the Exercise Motivation Scale (EMS) respectively to more accurately measure motivation as it is proposed by Deci and Ryan’s (1985, 2000) continuum. Three of the seven

subscales measure intrinsic motivation, intrinsic motivation to know, intrinsic motivation to accomplish things and intrinsic motivation to experience stimulation. Three subscales measure three types of extrinsic motivation: external regulation, introjected regulation and identified regulation and the last scale measures amotivation. SMS is a 28-item questionnaire with four questions per subscale.

Deci and Ryan (1987) argued that the type of motivation adopted by an individual is influenced by the social context in which he/she operates. They further elaborated that it is not the actual context and its objective characteristics that directly impact on individuals' motivation, but rather the psychological meaning that they attribute to it, the "functional significance" as they termed it. Contexts were examined following the distinction of the degree to which they supported autonomy and control of behaviour. Concluding, Deci and Ryan (1987) remark that when contextual factors are conducive to autonomy rather than control, people tend to be intrinsically more motivated, more creative, cognitively flexible, trusting, positive in emotional tone, and healthier. Their levels of self-esteem and perceived competence tend to be higher and they experience less aggression.

According to SDT, these types of motivation and the processes used in each one of them are facilitated by social conditions that fulfil psychological needs for autonomy, competence and relatedness, and forestalled within contexts that frustrate these needs. Ryan and Deci (2000) proposed that a reason why extrinsically motivated behaviours manifest, is because they are modelled by significant others to whom the individual manifesting these behaviours, needs to feel secured, attached, cared for, and related. The second reason that extrinsically motivated behaviours are internalised is because individuals need to feel efficacious regarding the activity that they are engaged in, within the context in which they operate. Finally, extrinsically motivated behaviours are more easily internalised when the social environment supports autonomy, so that the individual has the choice, volition and freedom to transform the values and goals promoted by their environment into their own. Consequently, the more the three needs are satisfied by the social environment, the greater the self-determination the individual experiences.

Transferring the SDT to the domain of sport, social environments that satisfy the athletes' psychological needs will promote more intrinsically regulated types of motivation. Few studies have investigated the impact of the social context and the

mediating role of needs on athletes' level of self-determination. Social contexts in these studies were approached in terms of coach autonomy-supportive versus controlling behaviours. Results from Blanchard and Vallerand's (1996) study showed that coach's interacting style affected athletes' satisfaction of the three needs and their subsequent motivation. The more the athletes perceived the coach as autonomy supportive the more competent, autonomous and related they felt towards their team, and the more intrinsically motivated they felt. This finding, namely that the coach's interactional style can affect greatly athletes' motivation has been confirmed by other studies as well (Cadorette, Blanchard, & Vallerand, 1996, as cited in Vallerand, 1997; Goudas et al. 1993, as cited in Goudas & Biddle, 1994; Thompson & Wankel, 1980). Athletes, who perceive their coaches as controlling, tend to report less intrinsic motivation and identified regulation than the athletes that perceive their coaches as more autonomy-supportive (Brière, Vallerand, Blais, & Pelletier, 1995; Pelletier, Fortier, Vallerand, & Brière, 2001; Pelletier, Fortier, Vallerand, Tuson, Brière, & Blais, 1995).

Apart from examining the coaching style as a social factor affecting motivation, the social context has also been examined in terms of the climate that the coach creates in the team. Standage et al. (2003) explored the influence of the motivational climate on need satisfaction and consequent motivation. Results from their study showed that athletes' perceptions of the motivational climate created by the coach contributed less than the autonomy versus supportive style of the coach to the satisfaction of the athletes' psychological needs and subsequent motivation. Athletes' perceptions of an ego-involving climate did not influence athletes' satisfaction of their psychological needs. These results are partly in agreement with Ntoumanis' (2001) study, where it was shown that one of the aspects of the task-involving climate had a positive impact on athletes' need satisfaction. Particularly, athletes' perception of the coach's emphasis on cooperative learning was found to predict the need for relatedness, while athletes' perception of the coach's emphasis on improvement and effort positively predicted the need for competence. Of the three needs, the need for competence was shown to be the best predictor of motivation. What becomes evident from both these studies is that different facets of the task-involving climate predict and are related in varying degrees to the three needs. Finally, ego-involving climate in Standage et al.'s (2003) study, did not reveal significant influences on the athlete's need satisfaction,

which is contradictory to Deci and Ryan's (1985, 2000; Ryan & Deci, 2000a, 2000b, 2000c, 2001) postulations on the negative influence of the ego-involving climate on athletes' needs. Ntoumanis (2001) did not include perceptions of an ego-involving climate in his model of social factors influencing athletes' motivation. It should also be noted at this point that both studies were conducted with students aged between 12-16 years, enrolled at PE classes. Participation in PE classes is more of a compulsory nature, whereas participation in sport is more of a voluntary nature. Although tenets of the AGT and the SDT are expected to apply equally to all contexts (e.g., educational, PE, sport), variation in the participants' responses might be attributed to the nature of the context. No published study thus far, has examined the impact of the motivational climate on athletes' motivation and the mediating role of the needs in this relationship.

Complementarily, there are no published studies that have investigated athletes' perceptions of the coach-athlete relationship, and more specifically in terms of the 3 Cs, on the different types of motivation. Given the significance of the social context regarding the relational side between the coach and the athlete, it is important to explore these links in order to enhance our understanding of the athletic experience. Lastly, given the importance of the coach in the creation of the motivational climate in the team and in the development of effective relationships with his/her athletes, it would be logical to study the satisfaction of the athletes' relationship needs. More specifically, the level to which athlete's needs for autonomy, competence, and relatedness, are satisfied within the athletic relationship between the coach and the athlete. The studies that have employed the concept of needs utilised the needs in the general sporting context and in terms of the peer context (Ntoumanis, 2001; Standage, et al., 2003; Reinboth et al., 2004). Moreover, no published study has looked into the moderating roles of the psychological needs of autonomy, competence and relatedness directed towards the coach and in relation to the coach, in the influence of the social contexts on athletes' motivation.

Having established the importance of the coach-athlete relationships and motivational climate as social contexts, on the athletes' motivation, the primary aim of Study 3a is to investigate the mechanisms by which these two contextual factors impact on several outcomes through the organismic-dialectic framework of self-determination theory (Deci & Ryan, 1985; 1991). Athletes in sport settings, where the coach promotes cooperation between members of the team, fairness, fosters and recognises the

contribution and the significant role of each player to the success of the team, along with the encouragement of learning and mastering the skills and techniques and an emphasis on effort and improvement, will be more likely to feel that they are related and cared for by their coaches, feel that they are more efficacious athletes and have more freedom to express themselves and subsequently exhibit more intrinsically motivated behaviours and feel more self-determined. Along the same lines, social environments, which promote high levels of the 3 Cs, are expected to satisfy athletes' psychological needs. Athletes who operate within an athletic relationship in which trust, respect, and liking are evident and mutual between the coach and the athlete are more likely to satisfy their need for relatedness. Athletes who operate within an athletic relationship marked by friendly and cooperative interactions with their coach are more likely to feel free to express themselves, articulate their opinions and take some initiative regarding their training within certain limits, thus enhancing their sense of autonomy. Finally, athletes that operate in an athletic relationship marked by mutual commitment and where both the coach and the athlete strive to work towards achieving better performance and excellence, they are more likely to feel capable and effective in their sport, thus feel more competent athletes. Moreover, social contexts that support the individual's needs satisfaction help in the maintenance and enhancement of intrinsic motivation and promote the integration of extrinsic motivation. Athletes in both social contexts, namely task-involving climates and coach-athlete relationships with levels of the 3 Cs, that satisfy the three psychological needs, are expected to feel more self-determined; their motivation is expected to be more intrinsically regulated.

Concluding, the aim of the present study is to examine the degree to which the needs for autonomy, competence and relatedness with regards to the relationship with their coach, are facilitated in the context of a) the coach-created motivational climate and b) the coach-athlete relationship, and the degree to which these needs promote more or less self-determined types of motivation. Specifically these hypotheses were tested:

In an effective (high levels of self- and meta-closeness, commitment and complementarity) coach-athlete relationship, more intrinsic types of motivation will be salient, because the athletes' needs for autonomy, competence and relatedness will have been satisfied.

In an ineffective (low levels of self- and meta-closeness, commitment and complementarity) coach-athlete relationship, individuals will adopt more extrinsic types of regulation, because the athletes' needs for autonomy, competence and relatedness will have been thwarted.

In a task-involving motivational climate, individuals will adopt more self-determined types of regulation, because the athletes' needs for autonomy, competence, and relatedness will have been satisfied.

In an ego-involving motivational climate, individuals will adopt more extrinsic types of regulation, because the athletes' needs for autonomy, competence and relatedness will have been thwarted.

5.2.2 Methodology

5.2.2.1 Participants

Participants were 776 university (495 male and 281 female) athletes aged 18 to 41 years of age ($M=21.49$, $SD=2.49$). Athletes were participating in a variety of team sports: rugby ($N=222$, 28.6%), football ($N=68$, 8.8%), hockey ($N=30$, 3.9%), volleyball ($N=34$, 4.4%), basketball ($N=60$, 7.7%), rowing ($N=114$, 14.7%), ultimate Frisbee ($N=40$, 5.2%), American football ($N=68$, 8.8%), netball ($N=72$, 9.3%), ice-hockey ($N=22$, 2.8%), lacrosse ($N=24$, 3.1%), handball ($N=6$, 0.08%), canoe polo ($N=6$, 0.08%), polo ($N=3$, .04%), cricket ($N=2$, .03%), baseball ($N=5$, 0.06%). The athletes' experience with their sport varied from 1 month to 30 years. The time the athletes spent with their team varied from 1 month to 14 years ($M=1.18$, $SD=1.55$). The time the athletes spent with their coach also varied ranging from 1 month to 7 years ($M=0.68$, $SD=0.99$). Participants varied in the amount of time that they devoted to their training ranging from 1 hour to 21 hours per week.

5.2.2.2 Procedures

Initially the coaches of each team were contacted and were asked for their assistance in conducting the study. They were given a letter including information on the purpose of the study and affirmation on the confidentiality and anonymity as well as the voluntary nature of the study. After obtaining permission from the coaches a convenient time was scheduled for the administration of a multi-section questionnaire.

The completion of the questionnaires took place at each team's training grounds before the commencement of a training session. Return of a completed questionnaire was taken as an indication of the athlete's consent to participate. Athletes were encouraged to answer as honestly as possible. Participants took approximately 20 minutes to complete the questionnaires. Data were collected throughout an academic year. Ethical approval was sought through Loughborough's ethical committee after completion of the relevant documents.

5.2.2.3 Instrumentation

Coach-Athlete Relationship: The Coach-Athlete Relationship Questionnaire/ self-perceptions (CART-Q self-perceptions: Jowett & Ntoumanis, 2004) was employed to measure athletes' self-perceptions of closeness, commitment, and complementarity. For this sample, the internal consistency scores of the CART-Q self-perception subscales were, .88 for Closeness, .78 for Commitment, and .84 for Complementarity, whereas reliability for the whole scale was .93.

The Coach-Athlete Relationship Questionnaire/meta-perceptions (CART-Q meta-perceptions: Jowett, 2002) was employed to measure athletes' meta-perceptions of closeness, commitment and complementarity. For this sample, the internal consistency scores of the CART-Q meta-perception subscales were, .88 for Closeness, .77 for Commitment, and .89 for Complementarity, whereas reliability for the whole scale was .94. A detailed description of the CART-Q questionnaires was presented at Chapter II, Literature Review, pp. 78-79, and Chapter III, Study 1, p. 101.

Motivational Climate: Motivational Climate was assessed by the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2: Newton, Duda, & Yin, 2000). The PMCSQ-2 comprises two higher order dimensions, labelled task- and ego-involving climate. Task-involving climate consists of the following three dimensions: 'cooperative learning', 'effort/improvement', and 'important role'. The ego-involving climate scale contains three dimensions: 'intra-team member rivalry', 'unequal recognition', and 'punishment for'.

For the present study the Cronbach alpha coefficients were for the subscale of effort/improvement .76, for the subscale of important role .78, for co-operative learning .81, whereas for the higher order scale of Task-involving climate was .89; Cronbach alpha coefficients were for the subscale of punishment for mistakes .80, and for unequal

recognition .88, whereas for the higher order Ego-involving subscale .89. Based on Newton et al.'s (2000) and Treasure and Roberts' (1998) findings, and on the present thesis' first study's results, in which the intra-team member rivalry scale consistently reported low reliability, it was not included in the present study. A detailed description of the PMCSQ-2 was presented at Chapter II, Literature Review, pp. 33-37, and Chapter III, Study 1, pp. 100-102.

Need Satisfaction: A modified version of the Need Satisfaction Scale (NSS; La Guardia, Ryan, Couchman, & Deci, 2000) was used to assess athletes' perceptions of their coach's contribution to the satisfaction of their basic needs. La Guardia et al. (2000) used a 15-item version of the initial NSS in their first study, to assess participants' perceptions of a target figure's contribution to the satisfaction of their needs for autonomy, competence, and relatedness, within the context of different relationships (e.g., romantic, familial). Reliabilities were reported for the scale as a whole, and ranged from .90 to .92. In their second study, La Guardia et al. used a modified 9-item version of NSS measuring three factors; the three factors assessed participants' perceptions of a target figure's contribution to the satisfaction of their needs for autonomy, competence, and relatedness, within the context of different relationships (e.g., romantic, familial, friendly). Every factor was measured by three items, two positively and one negatively worded. Reliabilities were reported for the whole scale, ranging from .85 to .94.

In the present analysis, reliabilities of the need satisfaction sub-scales were very low. Further examination of the items showed that the negatively worded items contributed to the low reliability. A decision was made to discard the negatively worded items. This decision was based on the argument that people's patterns of responses to oppositely worded items can produce two-factor structures (Spector, Van Katwyk, Brannick, & Chen, 1997). Thus, positively-worded items can load to one factor and negatively-worded items can load on a separate factor. Furthermore, psychometricians have suggested that the use of both positive and negative worded items might reduce the internal consistency of a scale and disrupt its dimensionality (Cronbach, 1950; Falthzik & Jolson, 1974). Thus the utilisation of only positive worded items was best recommended (Schreisheim & Eisenbach, 1995).

In this study, the scale was adapted to measure how participants met these needs through their relationship with their coach. A 6-item version was used to reflect the

basic needs: (a) the need for autonomy (2 items; e.g., “When I am with my coach, I feel free to be who I am”), (b) the need for relatedness (2 items; e.g., “When I am with my coach, I feel cared about”) and (c) the need for competence (2 items; e.g., “When I am with my coach, I feel like a competent athlete”). Ratings were made on a 7-point Likert scale that ranged from *strongly disagree* (1) to *strongly agree* (7) to indicate athletes’ experiences of need satisfaction. A modification of the basic stem was introduced before each item “When I am with my coach ...”.

Furthermore, items from the three subscales were collapsed into one factor as the reliability of the scales pertaining two items was still low. A composite score representing the athlete’s need satisfaction was considered to best represent and serve the aims of the present study and comply with the tenets of Self-determination theory. Reliability of the overall need satisfaction scale in the present study was .83. This does not diminish the value of the research conducted or the information derived from the present results. Further research though utilising a more valid measure of need satisfaction will provide more detailed information on the unique contribution of each of the three needs on outcome variables.

Motivation towards Sports. Sport Motivation was assessed by the Sport Motivation Scale (SMS; Pelletier et al., 1995). The SMS is a 28-item questionnaire including seven subscales reflecting Deci and Ryan’s (1985, 1991) three different types of intrinsic, three different forms of extrinsic motivation and amotivation as they have conceptualised them in self-determination theory. These subscales comprise Intrinsic Motivation to Know (e.g., “For the pleasure that I feel while learning training techniques that I have never tried before”), Intrinsic Motivation towards Accomplishments (e.g., “For the pleasure that I feel while executing certain difficult movements”), Intrinsic Motivation to Experience Stimulation (e.g., “For the intense emotions that I feel while I am doing a sport that I like”), Identified Regulation (e.g., “Because it is a good way to learn lots of things which could be useful to me in other areas of my life”), Introjected Regulation (e.g., “Because it is absolutely necessary to do sports if one wants to be in shape”), External Regulation (e.g., “Because it allows me to be well regarded by people that I know”), and Amotivation (e.g., “It is not clear to me anymore; I don’t really think my place is in sport.”). Athletes responded to the question “Why do you practice your sport?” in a seven-point scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). For this sample, the internal

consistency scores of the SMS subscales were, .73 for Intrinsic motivation to stimulate, .80 for Intrinsic Motivation towards Accomplishments, .79 for Intrinsic Motivation to Know, .73 for Identified Regulation, .73 for Introjected Regulation, .73 for External Regulation and .82 for Amotivation.

5.2.2.4 Data Analysis

5.2.2.5 Structural Equation Modelling Analysis

Structural Equation Modeling (SEM) was used to analyse the data. This methodology is a powerful and sophisticated statistical approach to model testing that has gained in popularity recently (Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001) and especially in the achievement goal theory domain. Hoyle (1995) described SEM as a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables, whereas Rigdon (1998) described it as a methodology for representing, estimating, and testing a theoretical network of (mostly) linear relations between variables. A structural equation model is a hypothesised pattern of directional and nondirectional relationships among a set of observed (measured) and unobserved (latent) variables (McCallum & Austin, 2000). The explosive growth in the application of SEM is due to its many advantages compared to other traditional techniques, such as regression and path analysis. Its greater strength lies at the fact that simultaneously one can test a measurement model in which measured variables are related to specified factors and at the same time test the relationships among the latent factors, accounting for both measurement and prediction errors.

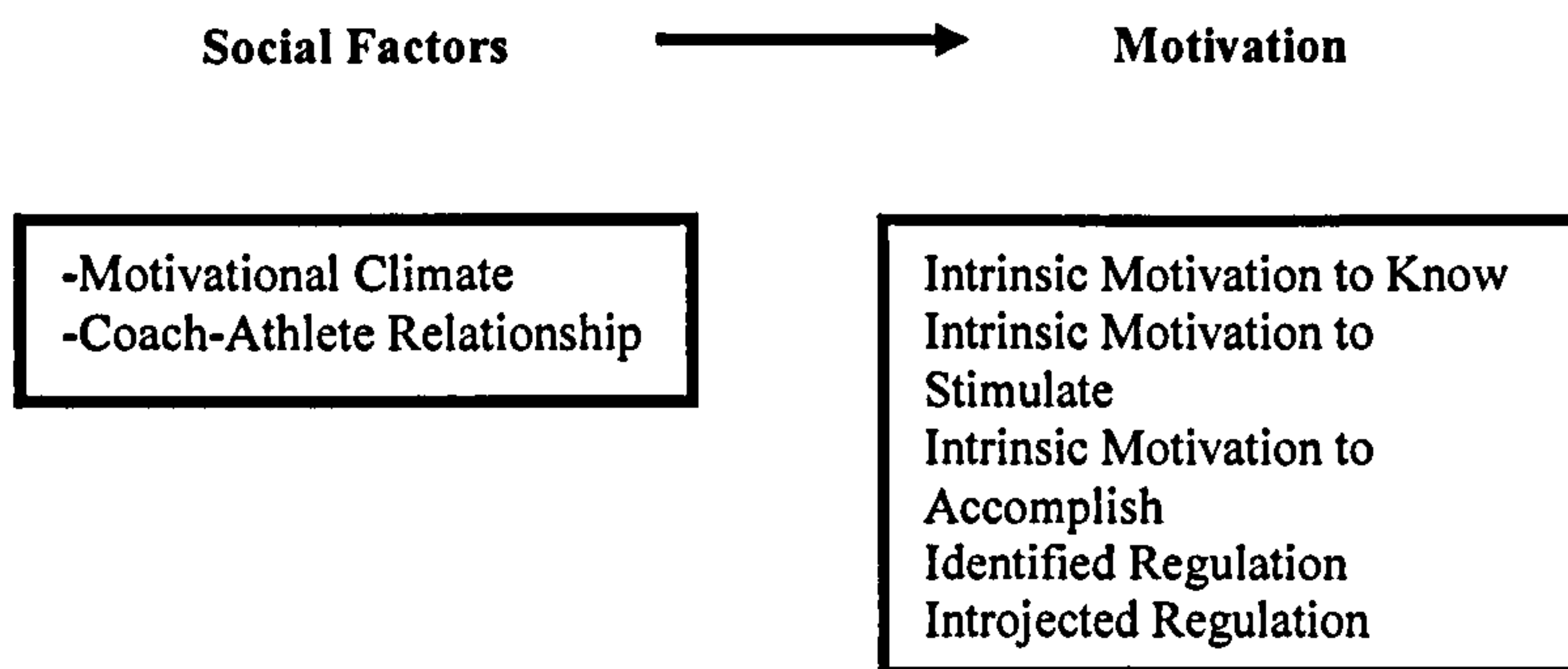
According to James, Mulaik, and Brett's (1982) and Jöreskog's (1993) recommendations a two-step approach was employed in this study to test the model. The first step according to Kline (1998) includes the assessment of the adequacy of the measurement models for each latent variable separately, and deals with the latent variables and their indicators. The second step, provided that the instruments reported acceptable fit to the data, includes the testing and fitting of the complete structural model.

Moreover, mediation in this study was tested through SEM. The major reason why SEM was selected over traditional multiple regression analyses to infer mediation was that SEM allows evaluation of overall fit of the theoretical model to the data. Another reason for selecting SEM was that all the variables assessed in the present study were

latent variables. SEM accounts for measurement error by using multiple indicators for each latent variable in the model (Bollen, 1989).

Baron and Kenny (1986) suggested that certain conditions for testing mediation should be met to infer mediation. These conditions included that (a) the independent variable or predictor (e.g., the coach-athlete relationship) should be significantly associated with the hypothesised mediator (e.g., need satisfaction), (b) the independent variable or predictor (e.g., the coach-athlete relationship) should be significantly associated with the dependent variable (e.g., motivation), (c) the mediator (e.g., need satisfaction) should be significantly associated with the dependent variable (e.g., motivation), and (d) the impact of the independent variable or predictor (e.g., the coach-athlete relationship) should be significantly less when controlling for the mediator variable (e.g., need satisfaction). A relationship between two variables is completely mediated, when in the presence of the mediator, the independent variable is not significantly associated with the dependent variable. A relationship is partially mediated, when in the presence of the mediator variable, the relationship between the independent and dependent variable is reduced in size but is still significant. All these conditions were met through different steps in SEM analyses.

Holmbeck (1997) argues that the SEM approach can be utilised to test mediated effects in two steps. In the first step, a model including the independent and the dependent variable is tested. If the model fits the data well, then the association between the two variables is estimated and should be significant. Holmbeck suggested that researchers should be careful when reporting mediational results as there is a difference between indirect and mediated effects. He stated that: "It is relatively commonplace for investigators who use SEM to claim support for a mediational model, when they have only tested the significance of and found support for an indirect pathway... it is critical to test whether the direct path between predictor and criterion is significant (Holmbeck, 1997, p.603)". Thus, in the present thesis, models were tested in the first step that included only the independent and dependent variables. The models that tested the direct effects can be viewed in Figure 14.

Figure 14: Direct effects model

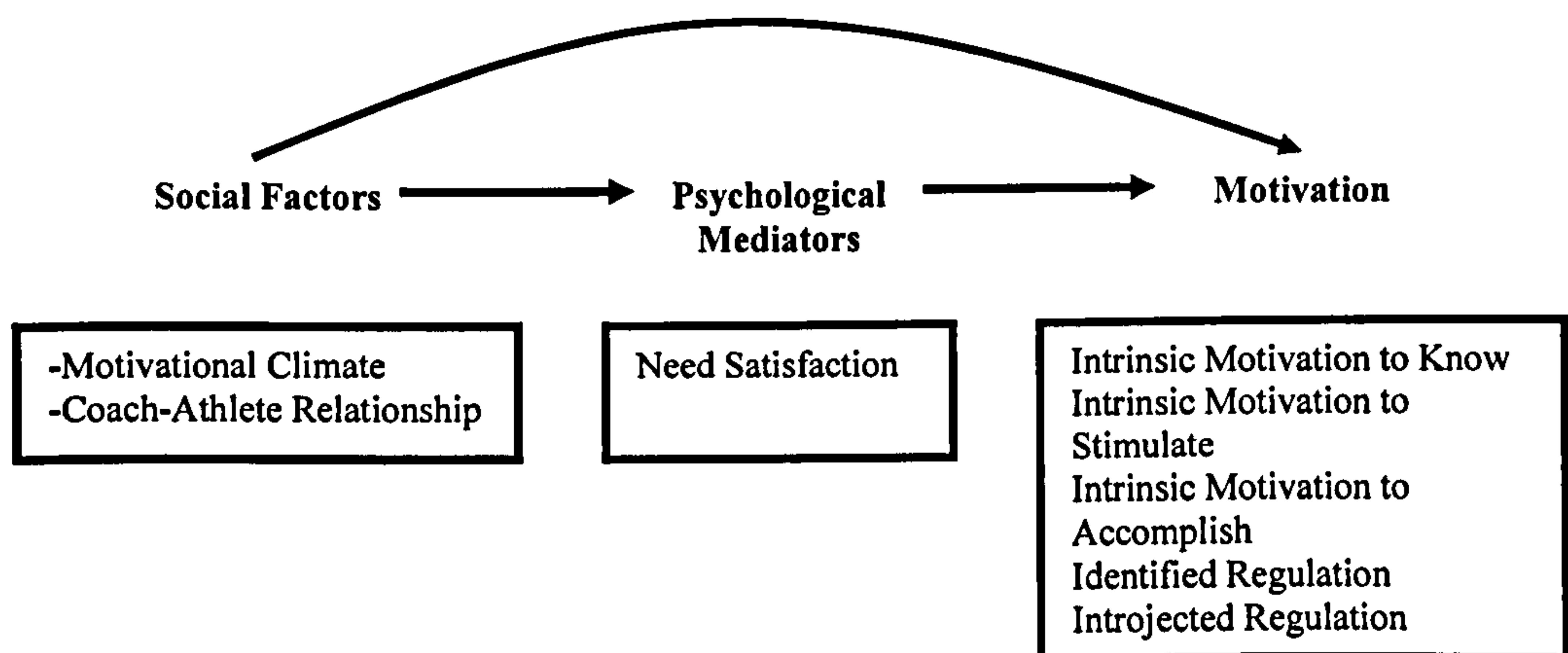
In the second step, the model is extended to include a mediating variable. Once the model yields an adequate fit to the data, the paths are examined for mediation. Specifically, Brown (1997) suggested that Barron and Kenny's (1986) conditions can be estimated through the direct, indirect paths, and total effects obtained from an SEM analysis. A direct effect is the influence a variable has on another variable in direct linkage. Thus, for example, in the present study the direct effects would be from the independent variables (e.g., coach-athlete relationship) to the mediator (e.g., need satisfaction); the other direct linkage would be from the mediator (e.g., need satisfaction) to the outcome variable (e.g., motivation). A (total) indirect effect includes all the paths from one variable to another that are mediated by at least another variable. Thus, for example the effect on the outcome variable (e.g., motivation) that includes the direct effects from the independent variables (e.g., coach-athlete relationship) and the mediator (e.g., need satisfaction). The total effect is the sum of direct and indirect effects. For example the effect on the outcome variable (e.g., motivation) that includes the direct effects of the independent variable (e.g., coach-athlete relationship) on the mediator (e.g., need satisfaction), the mediator (e.g., need satisfaction) to the outcome variable (e.g., motivation), and indirect effects of the independent variable (e.g., coach-athlete relationship) on the outcome variable (e.g., motivation). All three types of effects were estimated using EQS 6.1.

The proposed Models

The models tested in the present study aimed to test whether tenets from AGT and the 3 Cs could explain associations proposed by SDT. Due to the significant complexity that a model including three hierarchical and two first-order factor structures would reveal, it was decided that three models would be tested, one for each social factor

(e.g., self-perceptions of the coach-athlete relationship, meta-perceptions of the coach-athlete relationship, and motivational climate) that served as a determinant of need satisfaction and indices of motivation. More specifically, three separate models were developed: (a) in the first model, self-perceptions of the coach-athlete relationship served as the social factor, (b) in the second model, meta-perceptions of the coach-athlete relationship served as the social factor, and (c) perceptions of the motivational climate served as the social factor in the third model. The aim of the models was twofold. The first aim was to test whether the social factors of athletes' perceptions of the motivational climate and the coach-athlete relationship influenced athletes' need satisfaction. The second aim was to test whether the satisfaction of the athletes' needs could predict different types of their motivation. The hypothesised relationships are illustrated in Figure 15.

Figure 15: Hypothesised relationships according to SDT tested via SEM.



All models were tested using EQS 6.1b (Bentler, 2004). The normalized estimate of Mardia's coefficient was examined in each case to test for multivariate normality. Mardia's coefficient is a z score thus, 1.96 is a common criterion for cut-of point. The fit indexes utilised to assess the capability of the model to fit the data adequately included: Satorra-Bentler scaled χ^2 (S-B χ^2); robust Comparative Fit Index (CFI); Non-Normed Fit Index (NNFI); Standardised Root Mean Square Residual (SRMR); Root Mean Square Error of Approximation (RMSEA).

Sample size Because SEM relies on tests that require a relatively large sample sizes, Bentler and Chou (1987) have recommended at least 5 cases (10 is ideal) per free parameter estimate (path coefficients, variances, covariances, error terms), but a

general rule of thumb as to an adequate sample size is difficult to be provided (Tabachnick & Fidell, 1996). For the current study, estimation of the free parameters of the full structural model that includes relationships among the perceptions of the coach-athlete relationship, satisfaction of the athletes' needs and motivation yields 102 estimated free parameters. Following the recommended 5:1 ratio of participants to parameters a sample of 510 participants is required. This assumption is satisfied by the use of a sample of 776 team sport performers. Whereas, the full structural model which includes athletes' perceptions of the motivational climate, need satisfaction, and indices of motivation yields 118 free estimated parameters and according to the recommended 5:1 ratio of participants to parameters a sample of 590 participants is required. This assumption for this model is also satisfied by the use of a sample of 776 team sport performers.

5.2.3 Results

5.2.3.1 Descriptive Statistics

Table 11 contains mean, standard deviation, skewness, and kurtosis scores for each of the subscales of the questionnaires employed. All mean scores were relatively high for the 3 Cs (self- and meta-perceptions) and for the task-involving climate (co-operative learning, effort/improvement, and important role), whereas mean scores for ego-involving climate (punishment for mistakes and unequal recognition) were low to moderate on a scale from 1 to 7 (1 corresponds to low values and 7 corresponds to high values). Scores for need satisfaction were moderate to high suggesting that participants perceived a moderate to high satisfaction of their needs for autonomy competence and relatedness. Scores on intrinsic motivation and identified regulation were moderate to high whereas for the less self-determined forms of regulation were moderate to low.

Table 11: Descriptive Statistics of the subscales used in study 3a

| | Mean | S. D. | Skewness | Kurtosis |
|------------------------------------|------|-------|----------|----------|
| CART-Q/ self-perceptions | | | | |
| Closeness | 5.41 | 1.19 | -1.14 | 1.39 |
| Commitment | 4.71 | 1.18 | -.69 | .52 |
| Complementarity | 5.30 | 1.05 | -.98 | 1.41 |
| CART-Q/ meta-perceptions | | | | |
| Closeness | 4.87 | 1.05 | -.48 | .44 |
| Commitment | 4.39 | 1.13 | -.40 | .06 |
| Complementarity | 4.92 | 1.02 | -.52 | .63 |
| NSS | | | | |
| Need Satisfaction | 4.70 | .98 | -.45 | .55 |
| PMCSQ-2 | | | | |
| Cooperative Learning | 4.07 | .59 | -.75 | 1.37 |
| Effort/Improvement | 3.95 | .67 | -.63 | .65 |
| Important Role | 3.86 | .73 | -.54 | .22 |
| Punishment for Mistakes | 2.55 | .92 | .35 | -.61 |
| Unequal Recognition | 2.78 | .93 | -.03 | -.74 |
| SMS | | | | |
| Intrinsic Motivation to Stimulate | 5.22 | 1.04 | -.64 | .66 |
| Intrinsic Motivation to Accomplish | 5.14 | 1.04 | -.51 | .31 |
| Intrinsic Motivation to know | 4.59 | 1.14 | -.37 | .01 |
| Identified Regulation | 4.72 | 1.08 | -.60 | .44 |
| Introjected Regulation | 4.31 | 1.26 | -.37 | -.19 |
| External Regulation | 3.98 | 1.23 | -.35 | -.26 |
| Amotivation | 2.53 | 1.38 | .76 | -.27 |

Note: Response scale for the CART-Q/self- and meta-perceptions ranged from 1 to 7; for the NSS ranged from 1 to 7; for the PMCSQ-2 ranged from 1 to 5; and for SMS ranged from 1 to 7.

5.2.3.2 Gender Differences

Five one-way MANOVA were conducted in order to test for gender differences (i.e., the manner to which male and female athletes perceive the motivational climate, satisfaction of their basic needs, the coach-athlete relationship and motivation towards their sport). Non-significant multivariate main effect of gender emerged for the coach-athlete relationship as viewed by athletes' self-perceptions, Wilk's $\Lambda = 0.98$, $F(3, 772) = 4.04$, $p < .01$, and as viewed by athletes' meta-perceptions Wilk's $\Lambda = 0.99$, $F(3, 772) = 3.32$, $p < .05$. One way ANOVA showed non-significant differences between the genders relative to perceptions of need satisfaction Wilk's $\Lambda = 0.99$, $F(1, 774) = 0.79$, *ns*.

Significant main effect were observed for athletes' perceptions of the motivational climate, Wilk's $\Lambda = 0.85$, $F(5, 770) = 26.61$, $p < .01$, $\eta^2 = .147$, observed power = 1.00. Partial eta squared and observed power for Cooperative Learning were $\eta^2 = .023$, observed power = .990; for Effort/Improvement were $\eta^2 = .002$, observed power = .212; for Important Role were $\eta^2 = .023$, observed power = .990; for Punishment for Mistakes were $\eta^2 = .120$, observed power = 1.00; and for Unequal Recognition were $\eta^2 = .036$, observed power = 1.00. Females scored higher on the Cooperative Learning [univariate $F(1, 774) = 18.47$, $p < .01$], and Important Role subscales (task climate) than males [univariate $F(1, 774) = 18.37$, $p < .01$], whereas males scored higher on the Punishment for Mistakes [univariate $F(1, 774) = 106.01$, $p < .01$], and Unequal Recognition subscales (ego climate) than females [univariate $F(1, 774) = 28.59$, $p < .01$].

Significant main effects were observed for athletes' perceptions of their motivation towards sport Wilk's $\Lambda = 0.91$, $F(7, 768) = 11.35$, $p < .01$, $\eta^2 = .094$, observed power = 1.00. Partial eta squared and observed power for Intrinsic Motivation to Stimulate were $\eta^2 = .000$, observed power = .057; for Intrinsic Motivation to Know were $\eta^2 = .007$, observed power = .062; for Intrinsic Motivation to Accomplish were $\eta^2 = .001$, observed power = .128; for Identified Regulation were $\eta^2 = .005$, observed power = .509; for Introjected Regulation were $\eta^2 = .000$, observed power = .050; for External Regulation were $\eta^2 = .025$, observed power = .993; and for Amotivation were $\eta^2 = .029$, observed power = .998. Follow-up univariate analysis indicated that females scored higher than males on the intrinsic motivation to know [univariate $F(1, 774) = 5.67$, $p < .01$], and identification [univariate $F(1, 774) = 3.94$, $p < .01$] subscales. Males scored

higher on the amotivation [univariate $F(1,774) = 23.38, p < .01$], and external regulation [univariate $F(1, 774) = 19.50, p < .01$] subscales.

5.2.3.3 Bivariate Correlations

Simple correlations (see Table 12) revealed that the CART-Qs subscales were positively related to the needs satisfaction, task climate and the more self determined types of motivation and negatively related to ego climate and less self determined types of motivation. Interestingly, external regulation and introjection did not correlate at all with any of the subscales of CART-Q/self-perceptions and CART-Q/meta-perceptions, as well as any of the subscales of task-involving motivational climate. Punishment for mistakes was not related to self-Commitment, meta-commitment, effort/improvement and the intrinsic motivation and identified regulation subscales. Similarly unequal recognition was not related to the more self-determined types of motivation, namely, the three types of intrinsic motivation and the identified regulation. The rest of the correlations among the subscales within each instrument utilised in this study were as expected.

Table 12: Correlations among the subscales used in study 3a

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|-----------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--------|--------|---------|
| 1. Self-Closeness | | .79*** | .83*** | .65*** | .60*** | .65*** | .48*** | .43*** | .50*** | .35*** | -.09* | -.27*** | .23*** | .25*** | .18*** | .15*** | .05 | .01 | -.17*** |
| 2. Self-Commitment | | | .72*** | .64*** | .71*** | .61*** | .54*** | .42*** | .49*** | .34*** | -.03 | -.23*** | .21*** | .23*** | .20*** | .16*** | .04 | .05 | -.16*** |
| 3. Self-Complementarity | | | | .66*** | .56*** | .74*** | .53*** | .44*** | .47*** | .35*** | -.12*** | -.24*** | .30*** | .33*** | .21*** | .16*** | .05 | .03 | -.18*** |
| 4. Meta-Closeness | | | | | .78*** | .87*** | .66*** | .36*** | .36*** | .31*** | -.14*** | -.23*** | .28*** | .24*** | .15*** | .13*** | .04 | .02 | -.15*** |
| 5. Meta-Commitment | | | | | | .71*** | .63*** | .33*** | .36*** | .28*** | -.04 | -.20*** | .22*** | .20*** | .19*** | .13*** | -.00 | .04 | -.15*** |
| 6. Meta-Complementarity | | | | | | | .63*** | .39*** | .39*** | .32*** | -.12*** | -.21*** | .27*** | .26*** | .19*** | .17*** | .06 | .03 | -.14*** |
| 7. Need Satisfaction | | | | | | | | .35*** | .33*** | .33*** | -.11** | -.24*** | .29*** | .29*** | .25*** | .17*** | .05 | .10** | -.12*** |
| 8. Cooperative Learning | | | | | | | | | .70*** | .59*** | -.13*** | -.21*** | .30*** | .31*** | .21*** | .23*** | .01 | -.02 | -.27*** |
| 9. Effort/Improvement | | | | | | | | | | .62*** | -.04 | -.23*** | .25*** | .26*** | .23*** | .14*** | -.01 | -.02 | -.25*** |
| 10. Important Role | | | | | | | | | | | -.11** | -.29*** | .18*** | .20*** | .17*** | .13*** | -.01 | -.05 | -.20*** |
| 11. Punishment for Mistakes | | | | | | | | | | | | .59*** | -.04 | -.05 | .04 | .00 | .15*** | .22*** | .39*** |
| 12. Unequal Recognition | | | | | | | | | | | | | -.05 | -.04 | .03 | .03 | .13*** | .27*** | .39*** |
| 13. IM to Stimulate | | | | | | | | | | | | | | .87*** | .54*** | .51*** | .33*** | .29*** | -.20*** |
| 14. IM to Accomplish | | | | | | | | | | | | | | | .60*** | .57*** | .34*** | .31*** | -.19*** |
| 15. IM to Know | | | | | | | | | | | | | | | | .48*** | .30*** | .34*** | -.02 |
| 16. Identified Regulation | | | | | | | | | | | | | | | | | .44*** | .49*** | .05 |
| 17. Introjected Regulation | | | | | | | | | | | | | | | | | | .61*** | .25*** |
| 18. External Regulation | | | | | | | | | | | | | | | | | | | .34*** |
| 19. Amotivation | | | | | | | | | | | | | | | | | | | |

*** Correlation is significant at the 0.001 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2.3.4 Confirmatory Factor Analysis of the Instruments

In this study, the confirmation of the factor structures of the instruments used constituted the first step.

CART-Qs. Drawing from past research (Jowett, 2001; Jowett & Ntoumanis, 2004) a hierarchical model was specified for the self-perceptions of the coach-athlete relationship and the same model was applied to the meta-perceptions version, where the subscales of closeness, commitment and complementarity were subsumed.

PMCSQ-2. Furthermore, Newton, Duda, and Yin (2000) have recommended a hierarchical structure as well for the perceptions of the motivational climate. The two higher order dimensions being task and ego climate. Task involving climate comprises 3 subscales, whereas ego climate comprises two in the present study (the intra-team rivalry scale has been excluded from further analyses due to its very low reliability score).

NSS. The Satisfaction of the athlete's needs constituted one factor reflecting the three basic needs of autonomy, relatedness and competence (Deci & Ryan, 2000). Because of the reported poor reliabilities of the three dimensions of needs and because the concept of needs was essential to the study a composite score was calculated reflecting all the different needs.

SMS. A seven first-order factor model, in which all the subscales were correlated for SMS was tested. Previous research showed that the 7-factor structure fit the data well (Pelletier et al., 1995).

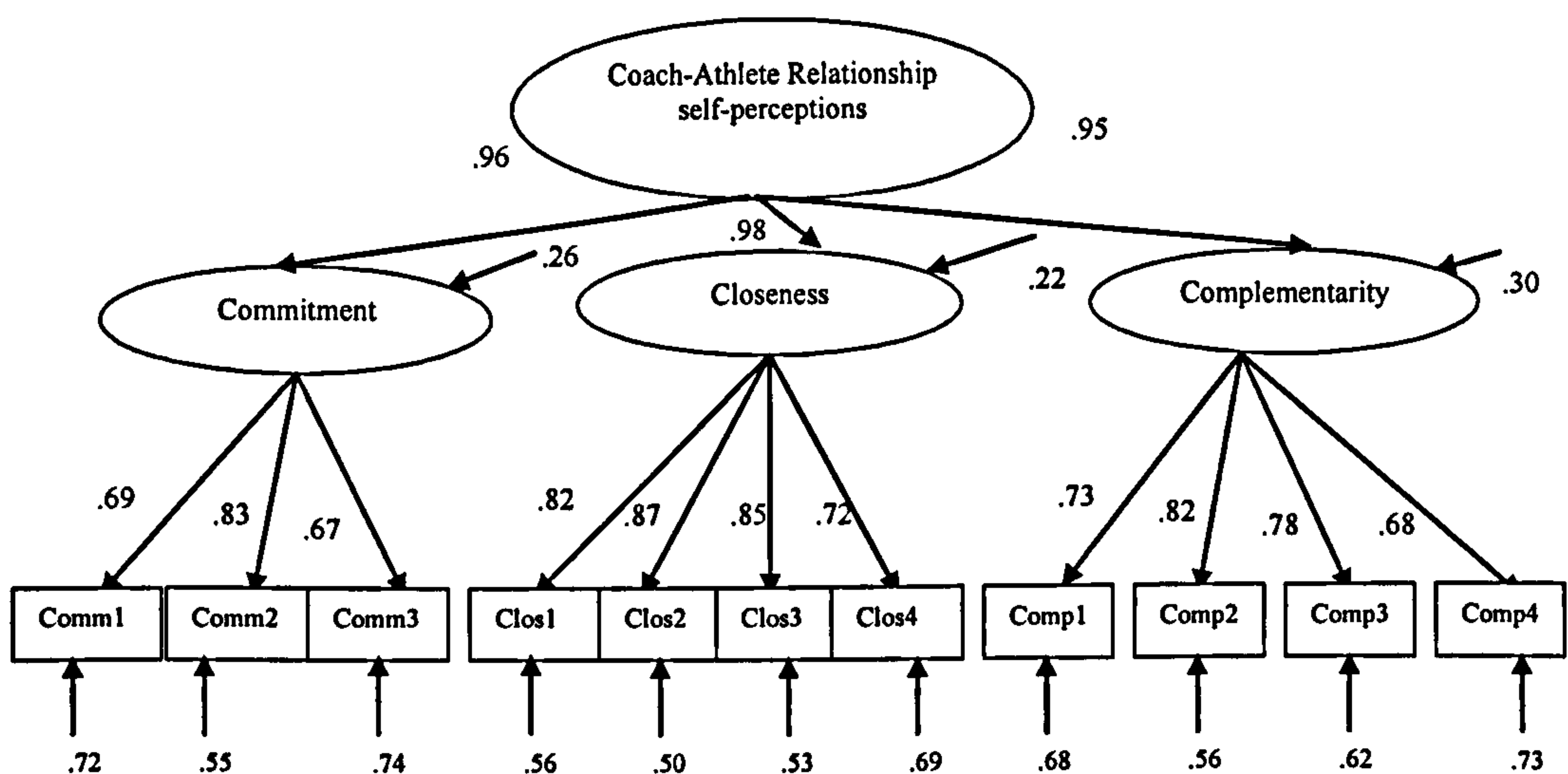
Results

Model Assessment.

CART-Q/self-perceptions: Mardia's coefficient was relatively high for the CART-Q/self-perceptions version (69.58) indicating a degree of multivariate non-normality, and therefore, the robust Maximum Likelihood estimation procedure was utilised. The hierarchical, second-order factor model in which the 3 Cs were contained for the self-perception version of the CART-Q produced marginal goodness of fit to the data in the current sample; $\chi^2(42) = 606.556$, $p < .001$, CFI = .90, NNFI = .87, SRMR = .05, RMSEA = .13 (.12, .14). The value of RMSEA is higher than the values of the other fit

indices, as the RMSEA penalises for low degrees of freedom. The formula for this fit index is $RMSEA = \text{square root of } \{[\max(\text{chi-square} - DF, 0)] / (df * (n-1))\}$. This is one of the reasons why RMSEA might be discrepant with the other global fit indices, many of which do not adjust for degrees of freedom. The present model has relatively low degrees of freedom. Moreover, for the self-perception version of the CART-Q all factor loadings were high and ranging from .95 to .98 and were statistically significant (see Figure 16). All items loaded as expected on their designated constructs.

Figure 16: The higher-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (self-perception version of the CART-Q).

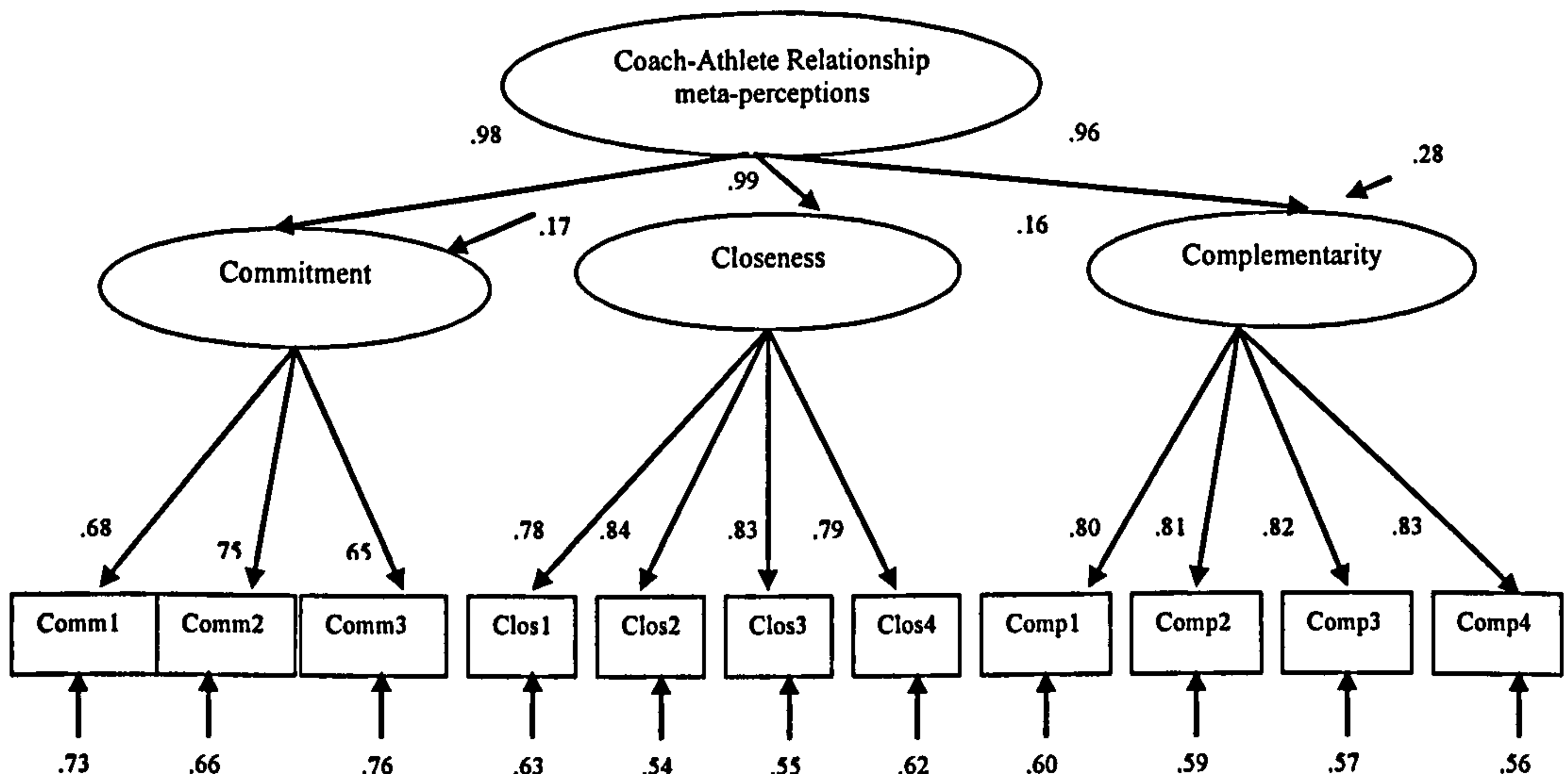


Note: All parameters are standardized and significant ($p < .001$).

CART-Q/meta-perceptions: Mardia's coefficient was relatively high for the meta-perceptions version (90.65). Robust statistics were used for the meta-perception version of the CART-Q because data were highly skewed, indicating non-normality. A hierarchical, second-order factor model for the meta-perception version of the CART-Q, generated adequate goodness of fit; Sattora-Bentler $\chi^2(42) = 311.517$, $p < .001$, robust CFI = .93, NNFI = .90, SRMR = .05, RMSEA = .09 (.08, .10). Similarly, for the meta-perception version of the CART-Q all factor loadings were high and ranging from .96 to .99 and were statistically significant (see Figure 17). All items loaded as expected on their designated constructs.

The squared multiple correlations (R^2) for each item and for both versions of the CART-Q were also examined. Values of R^2 greater than .50 mean that half of an item's variance is explained by the construct on which it loads; if an item records a value less than .50 then this means that more than half of an item's variance is unique and thus unexplained by the construct it is designated to measure (Kline, 1998). An inspection of the R^2 showed that self- and meta- perceptions items recorded values $\geq .50$ with the exception of three items that recorded a value of .49 ("I feel close to my coach"), .47 ("my coach feels close to me"), .46 ("I feel that my sport career is promising with my coach"), .41 ("My coach believes that my sport career is promising with him/her") and .47 ("When I am coached by my coach, I adopt a friendly stance").

Figure 17: The higher-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (meta-perception version of the CART-Q).

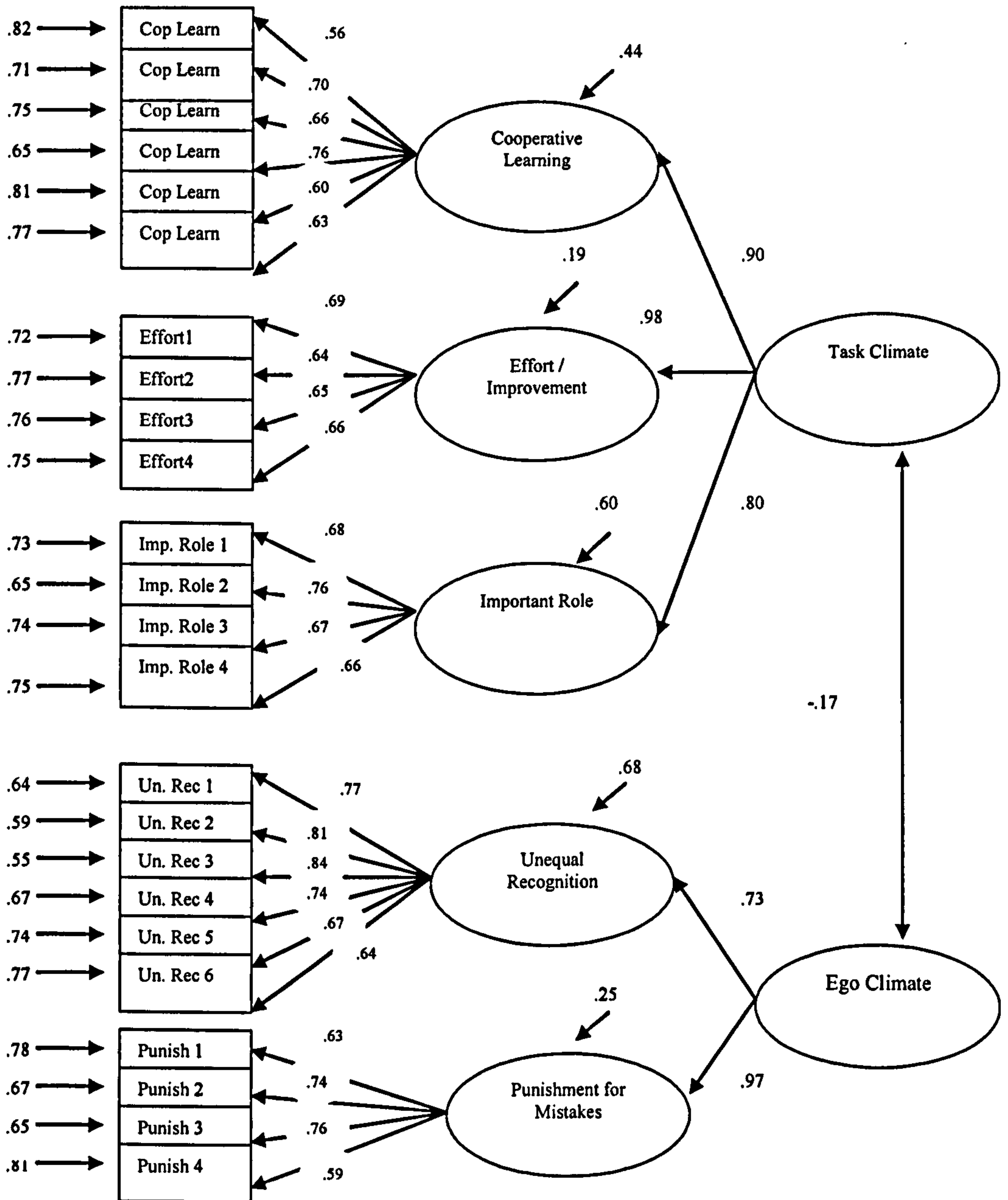


Note: All parameters are standardized and significant ($p < .001$).

PMCSQ-2: Mardia's coefficient was relatively high for the *PMCSQ-2* (55.81) indicating a degree of multivariate non-normality, and therefore, the robust Maximum Likelihood estimation procedure was utilised. The hierarchical, second-order factor model for the task and ego climate produced satisfactory goodness of fit to the data in the current sample; Satorra-Bentler scaled χ^2 (245) = 713.688, $p < .001$, CFI=.93, NNFI = .92, SRMR = .06, RMSEA= .05 (.04, .05). Factor loadings were high ranging

from .73 to .97. The two higher order factors exhibited a low negative correlation of -.17 (see Figure 18).

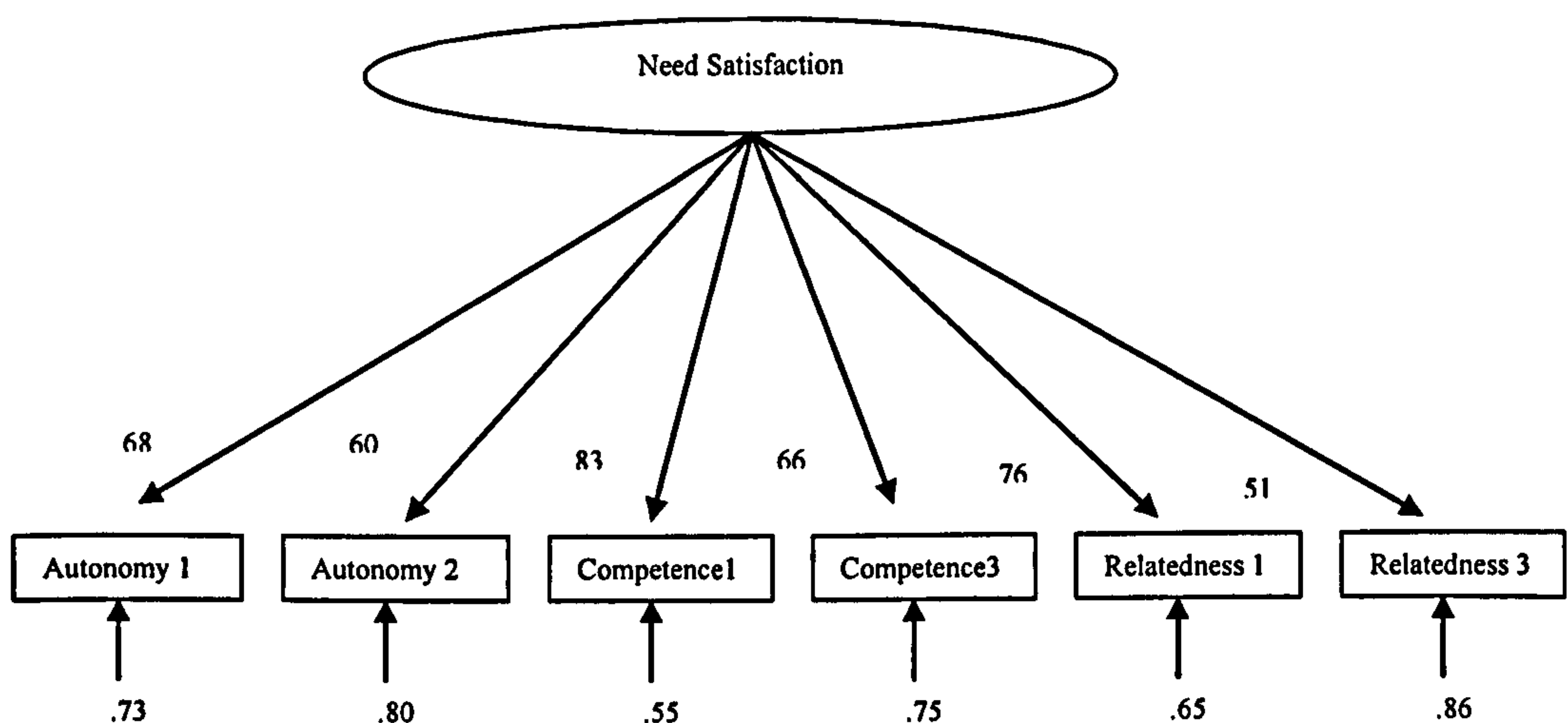
Figure 18: The higher-order factor Perceived motivational climate in sports and the five first-order factors Cooperative Learning, Effort/Improvement, Important Role, Unequal Recognition and Punishment for Mistakes (PMCSQ-2).



Note: All parameters are standardized and significant ($p < .001$).

NSS: Mardia's coefficient was relatively high for the NSS (33.15) indicating a degree of multivariate non-normality, and therefore, the robust Maximum Likelihood estimation procedure was utilised. The one factor model of need satisfaction which was imposed on the data generated satisfactory goodness of fit indices: Satorra-Bentler scaled χ^2 (9) = 70.737, $p < .001$, CFI=.94, NNFI = .90, SRMR = .04, RMSEA= .09 (.07, .11). All factor loadings were moderate to high ranging from .51 to .83 (see Figure 19).

Figure 19: The one factor Need Satisfaction (NSS).



Note: All parameters are standardized and significant ($p < .001$).

SMS: Mardia's coefficient was relatively high for the SMS (68.24) indicating a degree of multivariate non-normality, and therefore, the robust Maximum Likelihood estimation procedure was utilised. The seven factor solution for the SMS did not produce satisfactory goodness of fit indices: Satorra-Bentler scaled χ^2 (328) = 1173.890, $p < .001$, CFI=.88, NNFI = .86, SRMR = .06, RMSEA= .06 (.05, .06). A close inspection of the R^2 showed that one item reported a loading of .49 on the identification subscale and explained 23% of the variance in that factor. Items that report values of R^2 less than .50, explain less than half of the variance in the factor they purport to measure (Kline, 1998). Tabachnick and Fidell (1996) comment that "Choice of the cutoff for size of loading to be interpreted is a matter of researcher

preference” (p. 677). For this particular scale, and due to the unsatisfactory reported fit indices of χ^2 , CFI, NNFI, it was decided to drop this item for subsequent analyses.

The model was respecified omitting the first item loading on Identified Regulation, the covariances between Intrinsic Motivation to Know and Amotivation and Identification and Amotivation and was rerun. Results, after the exclusion of these pairs, showed that fit of the model improved a little bit failing to reach the recommended values: Satorra-Bentler scaled χ^2 (302) = 1020.225, $p < .001$, CFI = .89, NNFI = .87, SRMR = .06, RMSEA = .06 (.05, .06). Item loadings were moderate to high, ranging from .53 to .82 (see Figure 20). Correlations among the seven subscales ranged from -.04 to .87 (see Table 13). Two of the correlations were not statistically significant. The first one was a low negative correlation with a value of -.04 between the subscales of Intrinsic Motivation to Know and Amotivation. The second non-significant correlation reported a value of .03 between the subscales of Identification and Amotivation. Because the aim of this study was not to modify the instruments but report their factor structure as a first step of the full structural equation model and then the testing of that model, and because motivation was a significant variable, further analysis was conducted despite the low fit indices and the low R^2 reported in the CFA.

A closer look at the correlations among the subscales as suggested by the simplex pattern revealed unexpected results (see Table 13). Introjected regulation and external regulation positively correlated with the intrinsic motivation and the identification subscales. This finding contradicts Ryan and Connell's (1989) suggestions for the expected correlations among the subscales. In the simplex-ordered correlation structure, the subscales of motivation adjacent along the self-determination continuum, for example external regulation and introjection, are expected to be more positively and highly correlated than those that are more distant, for example external regulation and intrinsic motivation to know. Although, generally research in the education (Ryan & Connell, 1989) and sport domain (Pelletier, et al., 1995) has provided support for these associations, in Standage et al.'s (2003a, 2003b) papers, external regulation was excluded from further analysis due to its positive relationships with the more self-determined motivational regulations. Specifically, Standage et al. (2003) noted after an examination of some of the external regulation items that the subscale of External Regulation “taps a concern with the demonstration of superior physical competence to

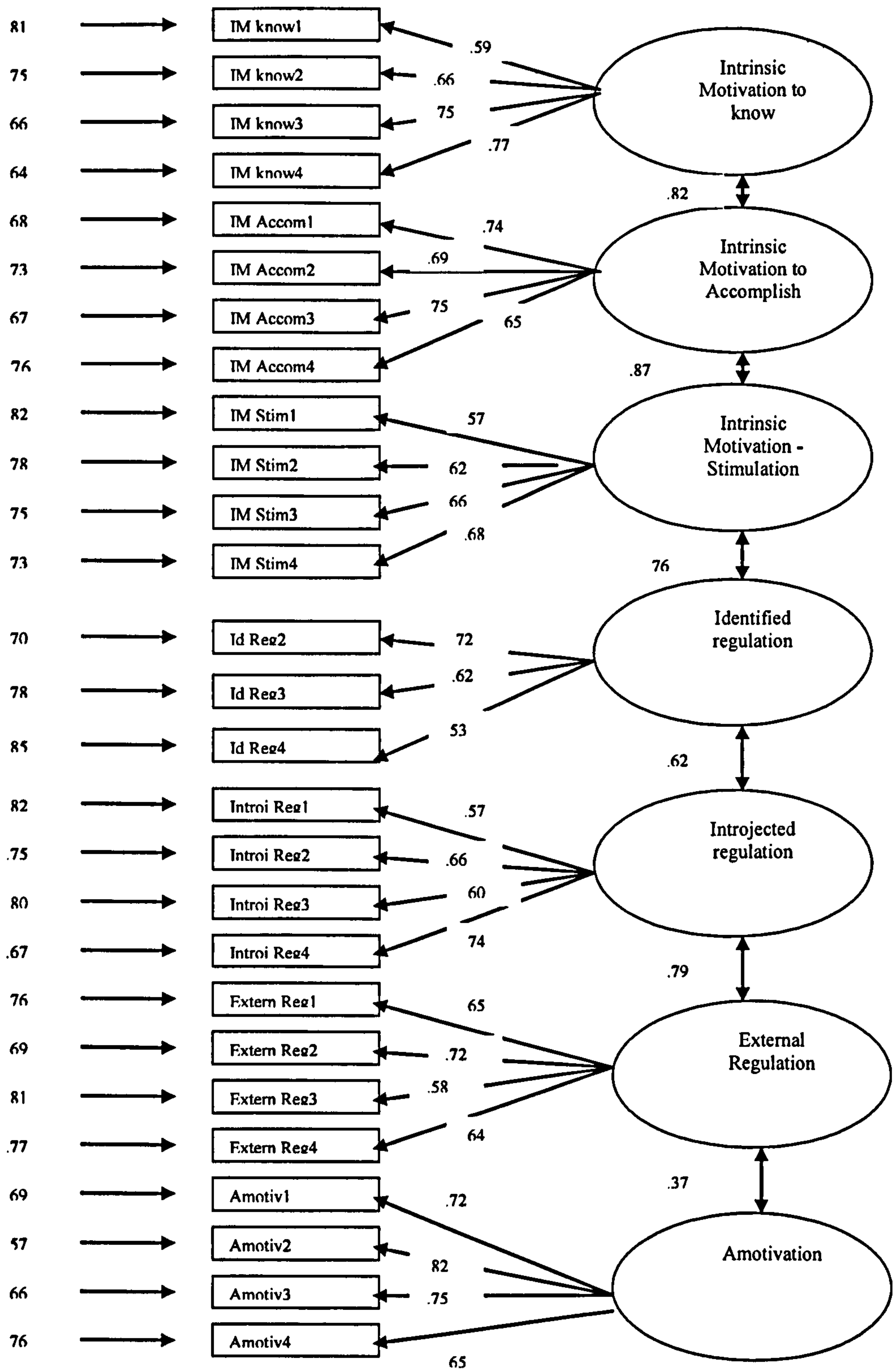
others rather than the controlling and externally regulated construct proposed by Deci and Ryan (1985)” (p.102).

In Standage et al.’s (2003a, 2003b) studies, Identified regulation was also found to exhibit unreasonably high correlations with all three types of intrinsic motivation which is the case in the present study as well ($r = .70$ to $.76$). To overcome this impediment Standage et al. (2003) excluded identified and external regulations from SEM analysis whereas the three types of intrinsic motivation were collapsed into one factor to represent self-determined motivation. In the present study, it was decided that all the subscales would be included in subsequent analyses, due to the nature of the research question.

Table 13: Correlations among the subscales of SMS

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------------|-------|-------|------|------|------|------|---|
| 1. Intrinsic Motivation to Stimulate | | | | | | | |
| 2. Intrinsic Motivation to Accomplish | .87* | | | | | | |
| 3. Intrinsic Motivation to Know | .67* | .82* | | | | | |
| 4. Identified Regulation | .76* | .74* | .70* | | | | |
| 5. Introjected Regulation | .45* | .33* | .41* | .62* | | | |
| 6. External Regulation | .41* | .39* | .44* | .69* | .79* | | |
| 7. Amotivation | -.26* | -.26* | -.04 | .03 | .29* | .37* | |

Figure 20: The seven-factor model for the motivation towards sport (SMS)



Note: All parameters are standardized and significant ($p < .001$).

Correlations between factors ranged from $-.04$ to $.87$.

The overall results from the Confirmatory Factor Analysis for each instrument can be seen in Table 14. In general, NNFI values ranged from .87 to .92 denoting a poor to acceptable fit to the data; CFI values ranged from .89 to .94 denoting acceptable to good fit to the data; SRMR values ranged from .04 to .06 denoting good fit to the data; RMSEA values ranged from .05 to .13 denoting very good to poor fit to the data.

Table 14: Fit indices from the CFA of the Instruments used in study 3a

| SCALE | χ^2 | NNFI | CFI | SRMR | RMSEA with 90% CI |
|---|-------------------------|------|-----|------|----------------------|
| CART-Q/s (4factor model: hierarchical) | $\chi^2 (42)=606.556$ | .87 | .90 | .05 | .13 (.12, .14) |
| CART-Q/m (4factor model: hierarchical) | $\chi^2 (42)=311.517$ | .90 | .93 | .05 | .09 (.08, .10) |
| PMCSQ-2 (hierarchical model, errors correlated) | $\chi^2 (245)=713.688$ | .92 | .93 | .06 | .05 (.04, .05) |
| NSS (1 factor model) | $\chi^2 (9)=70.737$ | .90 | .94 | .04 | .09 (.07, .11) |
| SMS (7 factors correlated, minus identification 1-item) | $\chi^2 (302)=1020.225$ | .87 | .89 | .06 | .06 (.05, .06) |

5.2.3.5 Structural Equation Models

The second step in SEM analysis, once the factor structure of each instrument utilised in the analysis has been confirmed is the building of a full structural model. Since the main objective in study 3 is to test for mediation, there should first be established that there is an association between the social factors measured (i.e., the coach-athlete relationship and the motivational climate) and the outcome variable (i.e., motivation). Thus, the following three models were tested:

- It was hypothesised that the athletes' self-perceptions of the coach-athlete relationship would positively influence the more self-determined regulatory styles and negatively the less self-determined regulatory styles.
- It was hypothesised that the athletes' meta-perceptions of the coach-athlete relationship would positively influence the more self-determined regulatory styles and negatively the less self-determined regulatory styles.

- It was hypothesised that the athletes' perceptions of a more task-involving motivational climate would positively influence the more self-determined regulatory styles and negatively the less self-determined regulatory styles. It was hypothesised that the athletes' perceptions of a more ego-involving motivational climate would negatively influence the more self-determined regulatory styles and positively the less self-determined regulatory styles.

Once there was adequate fit of the aforementioned models to the data, need satisfaction was introduced as the mediating mechanism according to Self-Determination Theory. Thus, the following three SEM models were tested for each of the contextual factors:

- It was hypothesised that the athletes' self-perceptions of the coach-athlete relationship would influence positively the more self-determined regulatory styles and negatively the less self-determined regulatory styles through the satisfaction of their basic needs.
- It was hypothesised that athletes' meta-perceptions of the coach-athlete relationship would influence positively the more self-determined regulatory styles and negatively the less self-determined regulatory styles through the satisfaction of their basic needs.
- It was hypothesised that athletes' perceptions of the coach-created motivational climate would influence positively the more self-determined regulatory styles and negatively the less self-determined regulatory styles through the satisfaction of their basic needs.

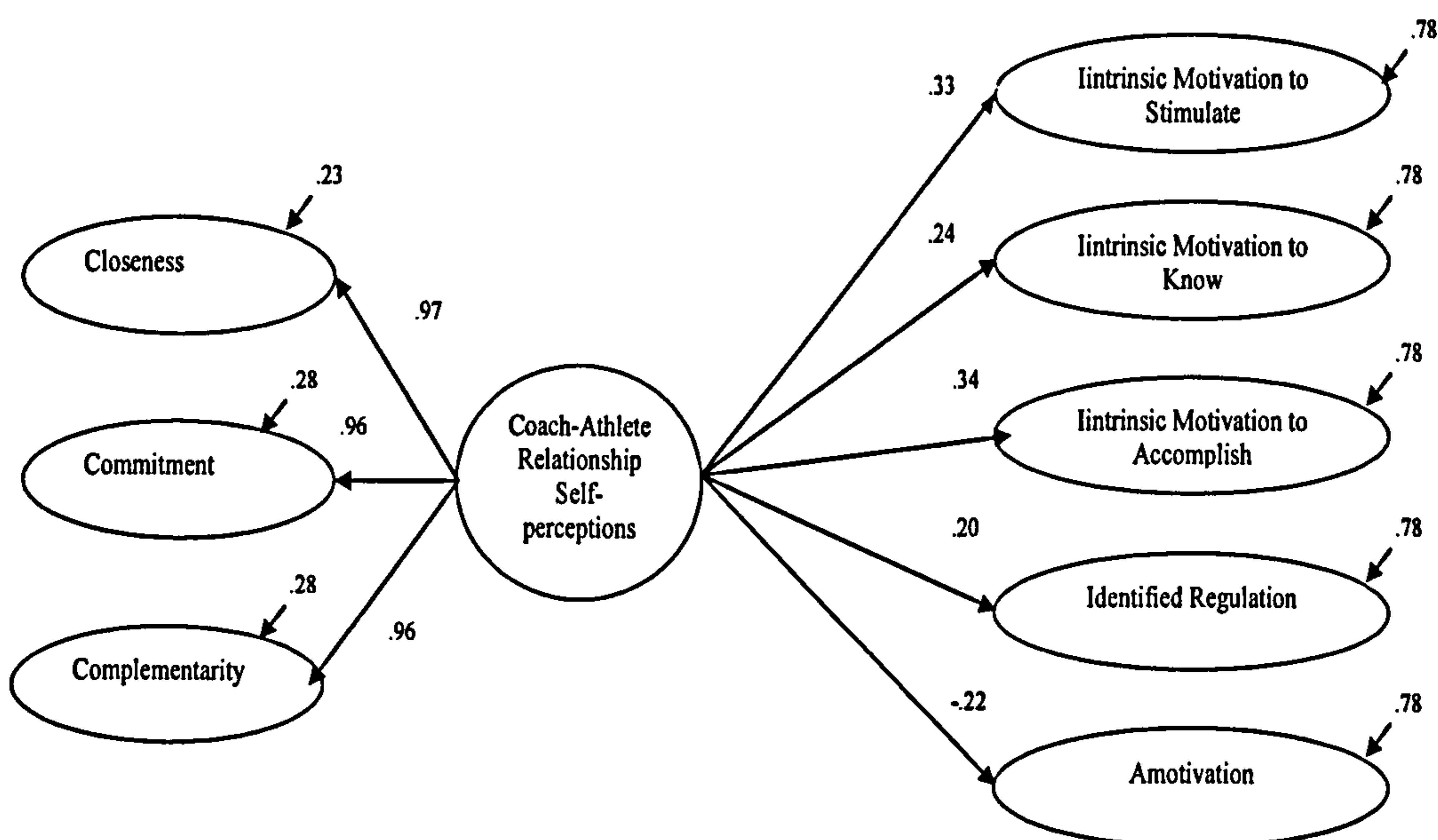
Results

Results of the first step in SEM analysis are summarised in Table 14.

Self-perceptions of the coach-athlete relationship. It was shown that for the first model, where the CART-Q/self-perceptions served as the independent variable and the indices of motivation as the dependent, the imposed model did not fit the data well: Satorra-Bentler scaled χ^2 (635) = 2505.085, $p < .001$, CFI = .88, NNFI = .87, SRMR = .05, RMSEA = .05 (.05, .06). Post hoc modifications were considered through evidence provided by the Lagrange Multiplier Test for adding parameters (LM-test; Bentler, 1995) and the Wald Test for dropping parameters. More specifically,

evidence provided by the Wald Test suggested that the two paths from the coach-athlete relationship to the introjected regulation and external regulation paths were non-significant. Furthermore, the covariance between the disturbances of Intrinsic Motivation to Know and Amotivation, and between Identified Regulation and Amotivation were non-significant. The model was modified by deleting these non-significant paths and was rerun. The revised model with two omitted paths and two omitted disturbance covariances yielded a better fit to the data: $\chi^2(389) = 1135.6301$, $p < .001$, CFI = .92, NNFI = .91, SRMR = .04, RMSEA = .05 (.05, .05). All paths were significant and their direction was as expected. Self-perceptions of the coach-athlete relationship positively predicted the three types of intrinsic motivation and identified regulation; whereas they negatively predicted amotivation. The final model can be seen in Figure 21.

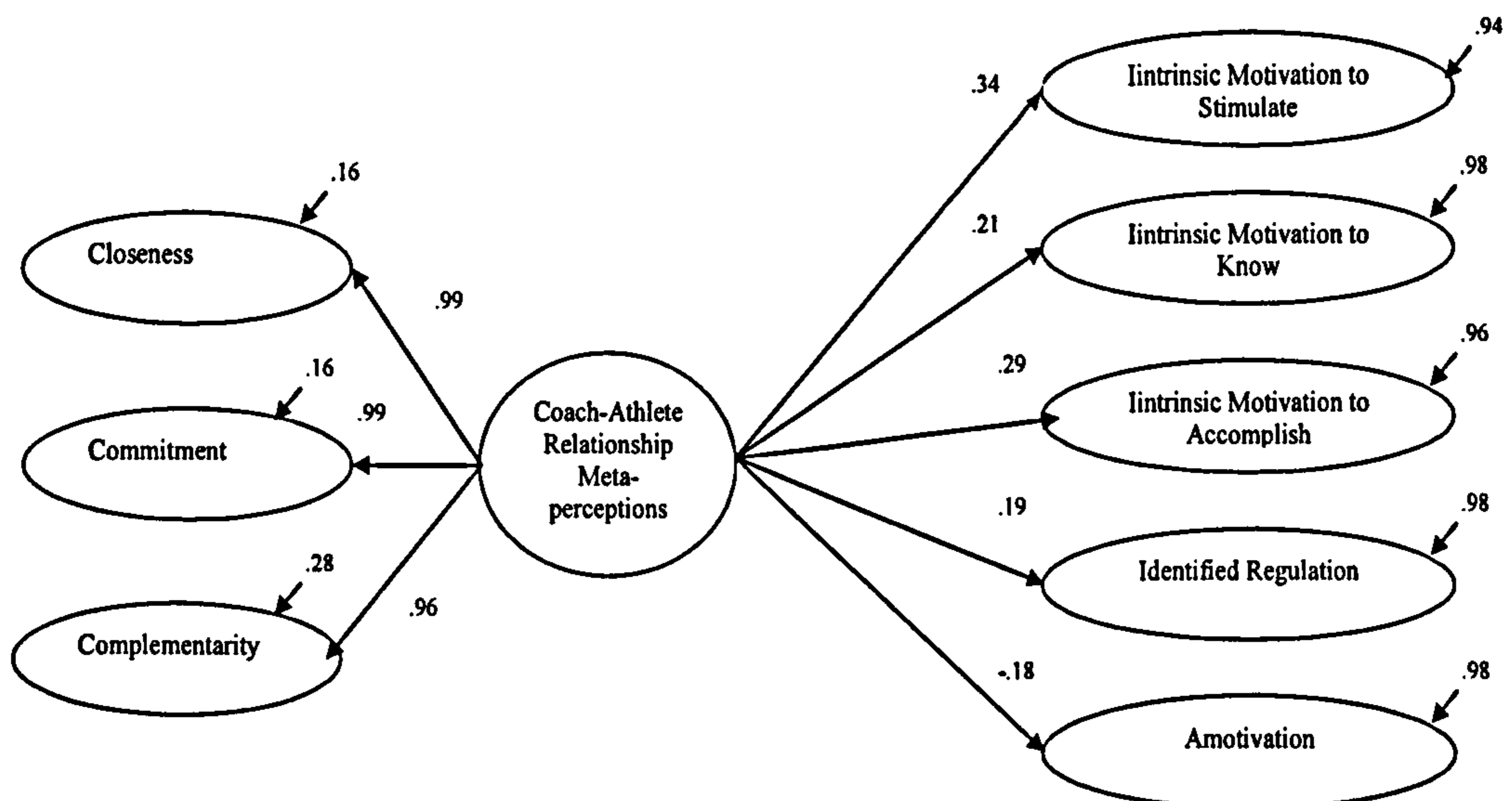
Figure 21: Direct model of the Coach-athlete relationship/self-perceptions and Motivation



Meta-perceptions of the coach-athlete relationship. For the second model, where the CART-Q/meta-perceptions served as the independent variable and the indices of motivation as the dependent, the imposed model did not fit the data well: Satorra-Bentler scaled $\chi^2(635) = 1912.5476$ $p < .001$, CFI = .88, NNFI = .87, SRMR = .05, RMSEA = .06 (.06, .06). Post hoc modifications were considered through evidence provided by the Lagrange Multiplier Test and the Wald Test. More specifically, the two paths from the coach-athlete relationship to the introjected regulation and external

regulation paths were non-significant. Furthermore, the covariance between the disturbances of Intrinsic Motivation to Know and Amotivation, and between Identified Regulation and Amotivation were non-significant. The model was modified by deleting these non-significant paths and was rerun. The revised model with two omitted paths and two omitted disturbance covariances yielded a better fit to the data: $\chi^2(390) = 1068.6018$, $p < .001$, CFI = .93, NNFI = .92, SRMR = .04, RMSEA = .05 (.04, .05). All paths were significant and their direction was as expected. Meta-perceptions of the coach-athlete relationship positively predicted the three types of intrinsic motivation and identified regulation; whereas they negatively predicted amotivation. The final model can be seen in Figure 22.

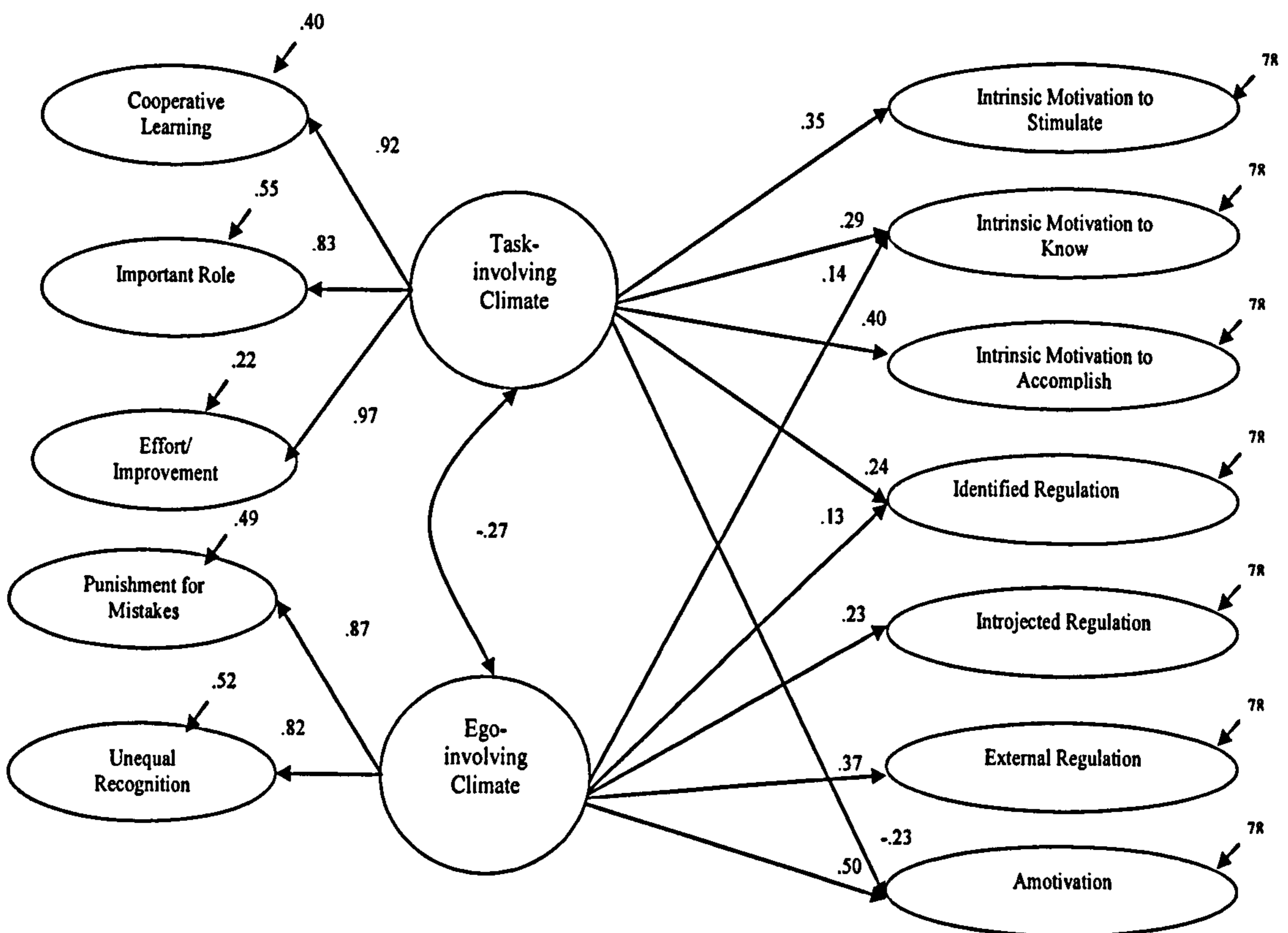
Figure 22: Direct model of the Coach-Athlete Relationship meta-perceptions and Motivation



Perceptions of the motivational climate. For the third model, where perceptions of the motivational climate served as the independent variable and the indices of motivation as the dependent, the imposed model did not fit the data well: Satorra-Bentler scaled $\chi^2(1180) = 2717.8848$, $p < .001$, CFI = .88, NNFI = .87, SRMR = .07, RMSEA = .05 (.05, .05). Post hoc modifications were considered through evidence provided by the Lagrange Multiplier Test and the Wald Test. More specifically, task-involving motivational climate paths to introjected regulation and external regulation paths were non-significant; ego-involving motivational climate paths to Intrinsic Motivation to Stimulate and Intrinsic Motivation to Accomplish were non-significant. Furthermore, the covariance between the disturbances of Intrinsic Motivation to Know and

Amotivation, and between Identified Regulation and Amotivation were non-significant. The model was modified by deleting these non-significant paths and was rerun. The revised model with two omitted paths and two omitted disturbance covariances yielded a better fit to the data: $\chi^2(1184) = 2516.5524, p < .001, CFI = .91, NNFI = .90, SRMR = .05, RMSEA = .04 (.04, .04)$. All the paths were significant and towards the expected direction. Perceptions of a more task-involving climate were positively associated with the three types of intrinsic motivation and identified regulation; whereas they were negatively associated with Amotivation. Perceptions of a more ego-involving motivational climate were positively associated with all types of extrinsic regulation. Perceptions of a more ego-involving motivational climate were also positively associated with Intrinsic Motivation to Know. Figure 23 shows the factor loadings and disturbance terms for the third model.

Figure 23: Direct model of the Motivational Climate and Motivation



Results of the SEM analysis including predictor and outcome variables are summarised in Table 15.

Table 15: Fit indices for Direct SEModels predicting motivation

| INDEPENDENT VARIABLE | χ^2 | NNFI | CFI | SRMR | RMSEA with 90% CI |
|---|----------------------------|------|-----|------|-------------------|
| CART-Q/s (9factor model: hierarchical & Motivation) | $\chi^2 (635)= 1135.6301$ | .91 | .92 | .04 | .05 (.05 , .05) |
| CART-Q/m (9factor model: hierarchical & Motivation) | $\chi^2 (635)= 1068.6018$ | .92 | .93 | .04 | .05 (.04, .05) |
| PMCSQ-2 (14factor hierarchical model & Motivation) | $\chi^2 (1184)= 2516.5524$ | .90 | .91 | .05 | .04 (.04, .04) |

Since the direct effect models showed a good fit to the data and since it was shown that the independent variables had a significant influence on the outcome variables, in the second step, the models were extended to include the predictor variable.

Self-perceptions of the coach-athlete relationship. In the first model CART-Q/self-perceptions served as the independent variable, the indices of motivation as the dependent and the need satisfaction as the mediator. Direct paths were added from self-perceptions of the coach-athlete relationship to motivation. It was shown that for the first model the imposed full structural model fit the data marginally: Satorra-Bentler scaled $\chi^2 (869) = 2454.782$, $p < .001$, CFI= .88, NNFI = .87, SRMR = .06, RMSEA= .05 (.05, .06). Post hoc modifications included the deletion of the non-significant paths from the self-perceptions of the coach-athlete relationship to the introjected and external regulations variables. The model was respecified and rerun. The modified model fit the data better but still marginally: Satorra-Bentler scaled $\chi^2 (572) = 1671.6262$, $p < .001$, CFI= .90, NNFI = .89, SRMR = .05, RMSEA= .05 (.05, .05). Figure 24 shows the loadings and paths for the mediational model.

To confirm the mediational role of need satisfaction the path from self-perceptions of the coach-athlete relationship to need satisfaction was removed and the model was rerun. Results showed that the non-mediational model did not fit the data well: Satorra-Bentler scaled $\chi^2 (573) = 1904.6619$, $p < .001$, CFI= .88, NNFI = .86, SRMR = .12, RMSEA= .06 (.05, .06). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with the path removed ($\Delta \chi^2 = (1, n=776) = 233.0357$ $p < .001$).

Also, consistent with Baron and Kenny's (1986) criteria for demonstrating a mediational effect, the paths between self-perceptions of the coach-athlete relationship and types of motivation dropped in the mediational model in comparison to the path obtained in the model including only the coach-athlete relationship and types of motivation. If the size of the path coefficient for the relation between self-perceptions of the coach-athlete relationship and types of motivation is substantially reduced after taking into account the influence of need satisfaction the data would be consistent with partial mediation (Baron & Kenny, 1986). Table 16 shows the total, direct, and indirect paths obtained from the mediational model. The results suggested that need satisfaction mediated partially the relationship between the coach-athlete relationship and motivation. At this point, it should be reminded that the total effect is the sum of the direct influence of the independent variable on the outcome plus the indirect influence. Thus, when controlling for need satisfaction, the direct effect of self-perceptions of the coach-athlete relationship on Intrinsic Motivation to Stimulate dropped (from .226, $se=.032$, $t=7.056$ to .125, $se=.039$, $t=3.185$). The same pattern for the direct effect of self-perceptions of the coach-athlete relationship was monitored for all types of motivation: for Intrinsic Motivation to Know the path dropped from .184, $se=.033$, $t=5.562$ to .074, $se=.043$, $t=1.720$; for Intrinsic Motivation to Accomplish the path dropped from .319, $se=.039$, $t=8.137$ to .197, $se=.051$, $t=3.837$; for Identified Regulation the path dropped from .206, $se=.046$, $t=4.438$ to .141, $se=.063$, $t=2.232$; and for Amotivation the path dropped from -.289, $se=.054$, $t=-5.332$ to -.233, $se=.073$, $t=-3.178$.

Figure 24: Mediational model for CART-Q/self-perceptions, Needs Satisfaction, and Motivation

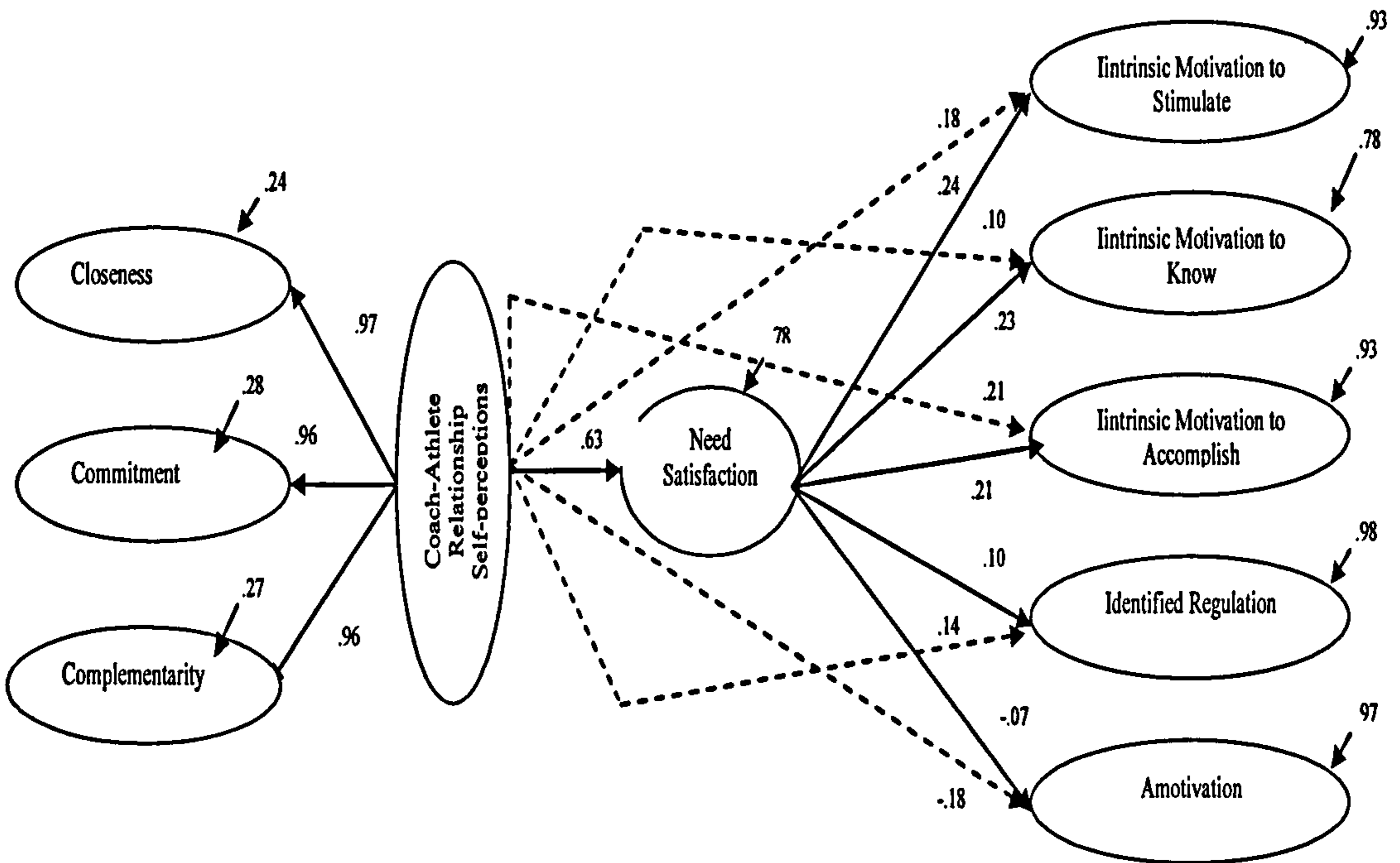


Table 16: Direct and indirect effects of the Coach-athlete relationship/self-perceptions on Motivation

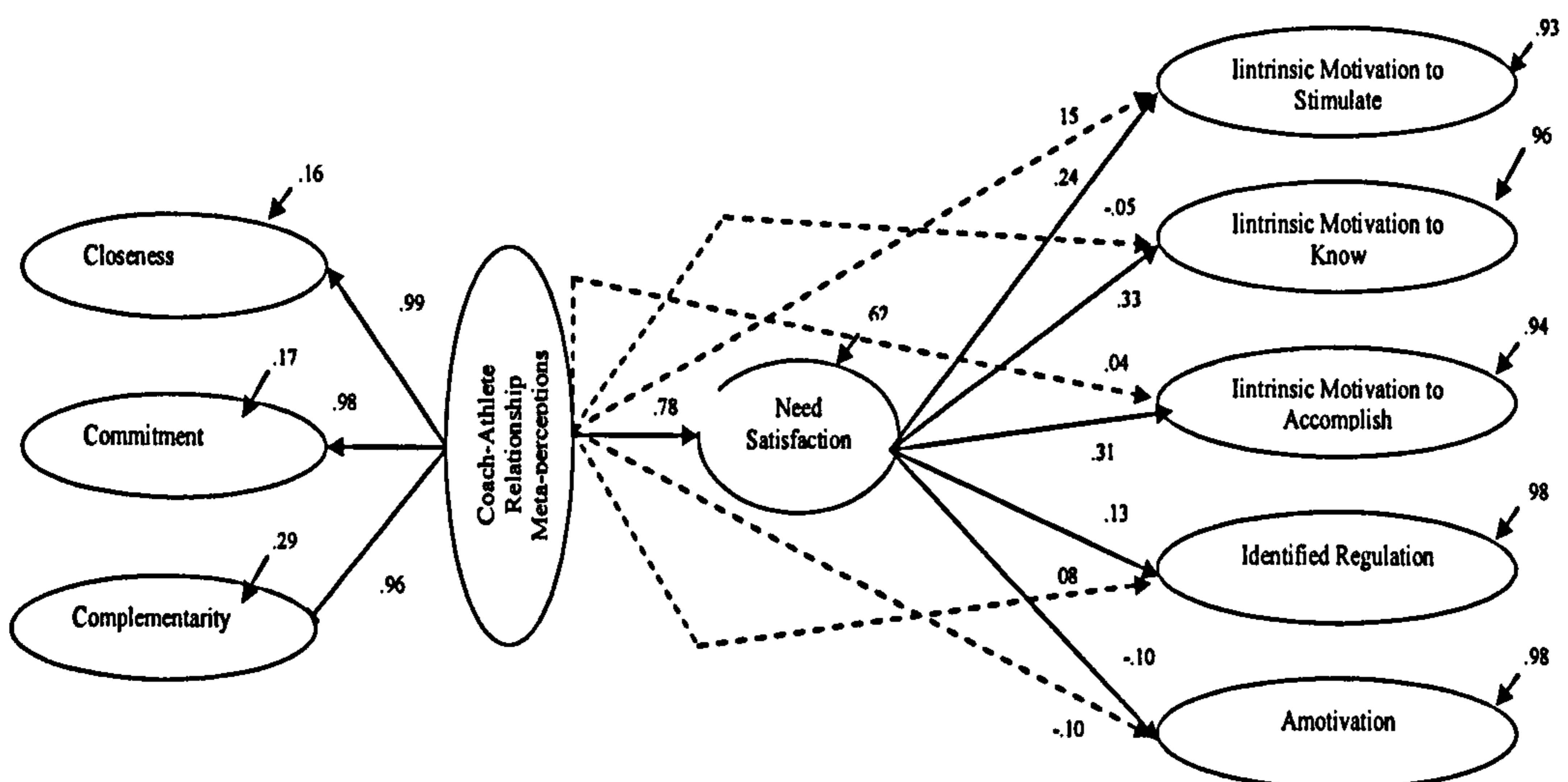
| | | Total effects of the Coach-athlete relationship/ self-perceptions | Direct effects of the Coach-athlete relationship/ self-perceptions | Indirect effects of the Coach-athlete relationship/ self-perceptions |
|------------------------------------|----|--|---|---|
| Intrinsic Motivation to Stimulate | | .226 | .125 | .101 |
| | se | .032 | .039 | .026 |
| | t | 7.056* | 3.185* | 3.840* |
| Intrinsic Motivation to Know | | .184 | .074 | .110 |
| | se | .033 | .043 | .029 |
| | t | 5.562* | 1.720 | 3.796* |
| Intrinsic Motivation to Accomplish | | .319 | .197 | .122 |
| | se | .039 | .051 | .034 |
| | t | 8.137* | 3.837* | 3.614* |
| Identified Regulation | | .206 | .141 | .065 |
| | se | .046 | .063 | .041 |
| | t | 4.438* | 2.232* | 1.587 |
| Amotivation | | -.289 | -.233 | -.056 |
| | se | .054 | .073 | .047 |
| | t | -5.332* | -3.178* | -1.189 |

Meta-perceptions of the coach-athlete relationship. For the second model, where the CART-Q/meta-perceptions served as the independent variable, the indices of motivation as the dependent and the need satisfaction as the mediator, the imposed

model fit the data marginally: Satorra-Bentler scaled χ^2 (869)= 1485.6595, $p<.001$, CFI=.90, NNFI = .89, SRMR = .05, RMSEA= .05 (.04, .05). Post hoc modifications included the deletion of the non-significant paths from the coach-athlete relationship to the introjected regulation and external regulation. The model was respecified and rerun. The modified model fit the data better: Satorra-Bentler scaled χ^2 (572) = 1488.8042, $p<.001$, CFI= .92, NNFI = .91, SRMR = .04, RMSEA= .05 (.04, .05). Figure 25 shows the loadings and paths for the mediational model.

To confirm the mediational role of need satisfaction the path from meta-perceptions of the coach-athlete relationship to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled χ^2 (573) = 1890.4542, $p<.001$, CFI= .88, NNFI = .87, SRMR = .14, RMSEA= .06 (.05, .06). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2= 401.65$ (1, $n=776$) = 401.6500 $p<.001$).

Figure 25: Mediational model for meta-perceptions of the coach-athlete relationship, need satisfaction, and motivation



Results suggested that need satisfaction mediated partially the relationship between meta-perceptions of the coach-athlete relationship and motivation. When controlling for need satisfaction, the direct effect of meta-perceptions of the coach-athlete relationship on Intrinsic Motivation to Stimulate dropped (from .227, $se=.032$, $t=7.108$

to .102, $se=.052$, $t=1.944$). The same pattern for the direct effect of meta-perceptions of the coach-athlete relationship was monitored for all types of motivation: for Intrinsic Motivation to Know the path dropped from .158, $se=.033$, $t=4.830$ to -.042, $se=.058$, $t=-.722$; for Intrinsic Motivation to Accomplish the path dropped from .262, $se=.039$, $t=6.722$ to .035, $se=.070$, $t=.498$; for Identified Regulation the path dropped from .185, $se=.046$, $t=3.996$ to .086, $se=.085$, $t=1.013$; and for Amotivation the path dropped from -.234, $se=.054$, $t=-4.338$ to -.132, $se=.099$, $t=-1.341$. Table 17 shows the total, direct, and indirect paths obtained from the mediational model.

Table 17: Total, Direct, and Indirect effects of meta-perceptions of the coach-athlete relationship on Motivation

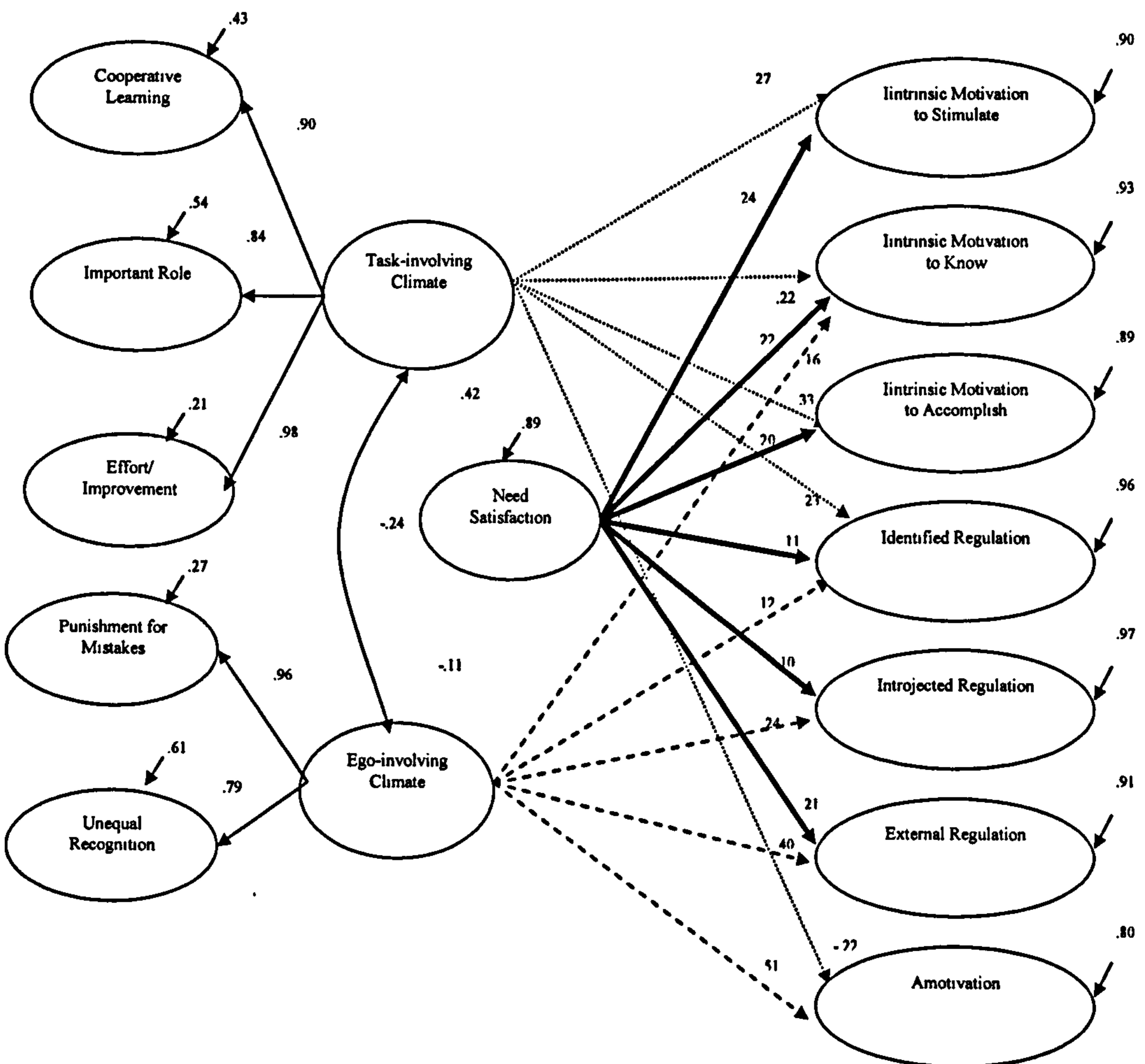
| | | Total effects of the Coach-athlete relationship/ meta- perceptions | Direct effects of the Coach-athlete relationship/ meta- perceptions | Indirect effects of the Coach-athlete relationship/ meta- perceptions |
|---------------------------------------|----|---|--|--|
| Intrinsic Motivation to Stimulate | | .227 | .102 | .125 |
| | se | .032 | .052 | .043 |
| | t | 7.108* | 1.944 | 2.913* |
| Intrinsic Motivation to Know | | .158 | .042 | .200 |
| | se | .033 | .058 | .049 |
| | t | 4.830* | -.722 | 4.097* |
| Intrinsic Motivation to Accomplish | | .262 | .035 | .228 |
| | se | .039 | .070 | .057 |
| | t | 6.722* | .498 | 3.962* |
| Identified Regulation | | .185 | .086 | .098 |
| | se | .046 | .085 | .069 |
| | t | 3.996* | 1.013 | 1.432 |
| Amotivation | | -.234 | -.132 | -.102 |
| | se | .054 | .099 | .079 |
| | t | -4.338* | -1.341 | -1.279 |

Perceptions of the motivational climate. For the third model, where the PMCSQ-2 served as the independent variable, the indices of motivation as the dependent and the need satisfaction as the mediator, the imposed model fit the data marginally: Satorra-Bentler scaled χ^2 (1485)= 3283.7143, $p < .001$, CFI=.89, NNFI = .88, SRMR = .05, RMSEA= .04 (.04, .04). Post hoc modifications included the deletion of the non-significant paths from the task-involving climate to the introjected and external regulations; the paths from the ego-involving motivational climate to Intrinsic Motivation to Accomplish and Intrinsic Motivation to Stimulate; and the path from need satisfaction to Amotivation. The model was respecified and rerun. The modified

model fit the data better but still marginally: Satorra-Bentler scaled χ^2 (1492) = 3156.3448, $p < .001$, CFI = .90, NNFI = .89, SRMR = .05, RMSEA = .04 (.04, .04). Figure 26 shows the loadings and paths for the structural model.

To confirm the mediational role of need satisfaction the path from perceptions of the motivational climate to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled χ^2 (1494) = 3447.4866, $p < .001$, CFI = .88, NNFI = .87, SRMR = .09, RMSEA = .04 (.04, .04). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2 = 291.1418$ (2, $n=776$) = 291.1418 $p < .001$).

Figure 26 : Mediational Model for Motivational Climate, Need Satisfaction, and Motivation



Results suggested that need satisfaction mediated partially the relationship between motivational climate and motivation. When controlling for need satisfaction, the direct effect of task-involving motivational climate on Intrinsic Motivation to Stimulate dropped from $.250$, $se=.032$, $t=7.744$ to $.181$, $se=.033$, $t=5.525$. The same pattern for the direct effect of task-involving motivational climate was monitored for all types of motivation: for Intrinsic Motivation to Know the path dropped from $.243$, $se=.034$, $t=7.079$ to $.171$, $se=.036$, $t=4.735$; for Intrinsic Motivation to Accomplish the path dropped from $.389$, $se=.039$, $t=9.946$ to $.310$, $se=.042$, $t=7.373$; and for Identified Regulation the path dropped from $.281$, $se=.043$, $t=6.476$ to $.235$, $se=.047$, $t=4.999$. When controlling for need satisfaction, the direct effect of ego-involving motivational climate on Intrinsic Motivation to Know the path increased from $.101$, $se=.028$, $t=3.615$ to $.120$, $se=.028$, $t=4.386$. The same pattern for the direct effect of ego-involving motivational climate was monitored for all types of motivation: for Identified Regulation the path increased from $.107$, $se=.042$, $t=2.561$ to $.120$, $se=.042$, $t=2.843$; for Introjected Regulation the path increased from $.211$, $se=.042$, $t=5.007$ to $.221$, $se=.043$, $t=5.151$; and for External Regulation the path increased from $.375$, $se=.047$, $t=8.032$ to $.399$, $se=.047$, $t=8.397$. Table 18 shows the total, direct, and indirect paths obtained from the mediational model.

Table 18: Total, Direct, and Indirect effects of the Motivational Climate on Motivation

| | | Total effects of Task-involving climate | Direct effect of Task-involving climate | Indirect Effects of Task-involving climate | Total effects of Ego-involving climate | Direct effect of Ego-involving climate | Indirect Effects of Ego-involving climate |
|------------------------------------|----|---|---|--|--|--|---|
| Intrinsic Motivation to Stimulate | t | .250 7.744* | .181 5.525* | .069 4.467* | -.018 -2.314* | | -.018 -2.314* |
| | se | .032 | .033 | .015 | .008 | | .008 |
| Intrinsic Motivation to Know | t | .243 7.079* | .171 4.735* | .072 4.245* | .101 3.615* | .120 4.386* | -.019 -2.264* |
| | se | .034 | .036 | .017 | .028 | .028 | .008 |
| Intrinsic Motivation to Accomplish | t | .389 9.946* | .310 7.373* | .079 4.092* | -.021 -2.251* | | -.021 -2.251* |
| | se | .039 | .042 | .019 | .009 | | .009 |
| Identified Regulation | t | .281 6.476* | .235 4.999* | .046 2.057* | .107 2.561* | .120 2.843* | 1.012 -1.625 |
| | se | .043 | .047 | .022 | .042 | .042 | .007 |
| Introjected Regulation | t | .039 2.214* | | .039 2.214* | .211 5.007* | .221 5.151* | -.010 -1.700 |
| | se | .018 | | .018 | .042 | .043 | .006 |
| External Regulation | t | .089 4.372* | | .089 4.372* | .375 8.032* | .399 8.397* | -.023 -2.267 |
| | se | .020 | | .020 | .047 | .047 | .010 |
| Amotivation | t | -.293 -5.699* | -.293 -5.699* | | -.672 | .672 11.443* | |
| | se | | .051 | | | .059 | |

Table 19 summarises the results of the fit indices from the mediational models

Table 19: Summary of results for the Mediational Models

| INDEPENDENT VARIABLE | χ^2 | NNFI | CFI | SRMR | RMSEA with 90% CI |
|-------------------------------|---------------------------|------|-----|------|-------------------|
| CART-Q/s (mediational model) | $\chi^2 (572)= 1671.6262$ | .89 | .90 | .05 | .05 (.05 , .05) |
| CART-Q/s (no-mediation model) | $\chi^2 (573)= 1904.6619$ | .86 | .88 | .12 | .06 (.05 , .06) |
| CART-Q/m (mediational model) | $\chi^2 (572)=1488.8042$ | .91 | .92 | .04 | .05 (.04, .05) |
| CART-Q/m (no-mediation model) | $\chi^2 (573)=1890.4542$ | .87 | .88 | .14 | .06 (.05, .06) |
| PMCSQ-2 (mediational model) | $\chi^2 (1492)=3156.3448$ | .89 | .90 | .05 | .04 (.04, .04) |
| PMCSQ-2 (no-mediation model) | $\chi^2 (1494)=3447.4866$ | .87 | .88 | .09 | .04 (.04, .04) |

5.2.4 Discussion

The aim of Study 3a was to test whether athletes in social situations that provided the necessary conditions for the satisfaction of the three needs exhibited more self-determined motivation. More specifically, it was hypothesised that athletes perceiving high levels of the 3 Cs and a task-involving climate would satisfy their needs for autonomy, competence and relatedness, thus exhibit more intrinsic levels of self-determination. Results from SEM analyses provided inconsistent fit indices for the fit of the models to the data. Although the SRMR and RMSEA suggested that all the models fit the data well, the NNFI and CFI suggested that the models fit the data was less good. The χ^2 was very high for all the data and statistically significant indicating a poor fit of the models to the data.

Curran, Bollen, Chen, Paxton, and Kirby (2003) have stated that the assessment of model fit is one of the most controversial issues in SEM. The EQS program produces numerous goodness-of-fit indexes that can be used to assess overall model fit. This discrepancy and inconsistency in the reported fit indexes can be easily explained. Newsom (2002) suggested that the χ^2 is a reasonable measure of fit in models, which use 75 to 200 participants. On the other hand, models that use more than 200 cases produce a χ^2 that is almost always large and statistically significant. Similarly, the CFI is not a very good fit index because it is directly calculated from the χ^2 and the degrees of freedom of the model. When large samples produce large χ^2 type I error might occur. Accordingly, models of increasing complexity in their structure produce larger and significant χ^2 . In the present study, 776 cases were used which constitutes a large sample, and the analysis included second- and first-order measures, resulting in a complicated model. Thus, relying on the χ^2 would not provide an accurate picture of the model fit. The results support claims that more than one fit index should be consulted when judging the adequacy of a model (Tanaka, 1993).

Moreover, Bentler and Chou (1987) argued that:

“In large samples, in particular, even the best model may not fit, since the sample-size multiplier that transforms the fit function into a χ^2 variate will multiply a small lack of fit into a large statistic. To avoid such frustration, without a great deal of knowledge about the variables under study, it is wisest to analyze relatively small data sets, say, 20 variables at most.” (p. 97)

Additionally, the CFI falls in the category of the baseline fit indices, that is, it uses a baseline model, in which all variables are uncorrelated and only variances are estimated, to compare the relative fit of the hypothesised model (Curran et al., 2003). On the other hand the RMSEA belongs to the absolute fit indices family that do not measure fit relative to some baseline model. The theoretical assumptions behind the RMSEA suggest that the pursuit of the perfect fit should be replaced with the estimation of how well the imposed model approximates the true model (Hox & Bechger, 1998). Each category encompasses strengths and limitations (Rigdon, 1998; Tanaka, 1993).

Taking into consideration all the above controversy on the reported fit indices, the following points are inferred:

- a) the significant χ^2 and the CFI statistics suggest that all these models should be rejected.
- b) the SRMR and RMSEA fit indexes suggest a good fit of the imposed model to the data.
- c) taken together these results suggest that the imposed models fit the data acceptably, and that results should be interpreted with caution.

Once the assessment of model fit has been estimated by the goodness of fit indices, an inspection of the parameter estimates will present more information about the confirmation of the specified structural paths, and the predictive relationships among the latent variables.

Social Factors and Need Satisfaction. With regard to the links of the social factors, it was shown that moderate to strong and positive paths connected the self- and meta-perceptions of the coach-athlete relationship with the needs satisfaction of autonomy, competence and relatedness (.64 and .78 respectively). Moderate to low paths connected the task- and ego-involving motivational climate to the satisfaction of the needs (.47 and -.15 respectively). When the athletes felt that they trusted, respected, liked their coach, were committed to the athletic relationship, interacted in a complementary way towards their coach in their training sessions, and when they perceived that their coach shared similar views, they were more likely to feel closer and connected to their coach, feel more efficacious at his/her presence, and feel free to be themselves and express their opinion. In the same line when athletes perceived that

their coach promoted a social environment that was directed towards learning, and exertion of effort they were more likely to feel greater competence regarding their athletic skills; when they perceived that the coach welcomed the contribution of all the athletes in the team, it was most likely that their competence would boost; lastly, when the athletes perceived that their coach promoted cooperation among the teammates they felt more related to the other members of the team but also the coach. On the whole, in a task-involving climate the athletes should feel more competent, and more related to the other members of the team but most importantly the coach, and more autonomous in the sense that they will feel that they had the chance and freedom to express their opinions. On the contrary, athletes who perceived an ego-involving climate, where the coach was biased towards the best players and unfair to the majority of the players, as well as punitive towards the players' mistakes, they were less likely to feel free and comfortable to express their opinions and be themselves, more importantly it was more likely to feel incompetent as athletes and less related to their coach.

The present results are in line with Ames' (1992) contentions that mastery (task-involving) motivational climates are assumed to encourage feelings of belongingness and cooperation. Ntoumanis (2001) found that the endorsement of cooperation among the students in a PE classes by the PE teacher promoted feelings of relatedness and connectedness among the fellow students and an emphasis on learning and improvement promoted feelings of competence. Similarly, Kowal and Fortier (2000) found that swimmers' perceptions of a task-involving motivational climate positively predicted perceptions of relatedness towards their teammates, whereas they did not predict perceptions of autonomy and competence. The authors concluded that social climates that emphasise mastering the tasks, learning and personal improvement may enhance athletes' feelings of connectedness with others. In their study, task-involving climate did not predict feelings of competence or autonomy at all. They attributed this finding in the potential moderating effect of gender, and the situational level at which these variables were assessed. Although these studies have conceptualised the need of relatedness pertaining to the fellow students, players and teammates, and the contexts within which these studies were conducted are diverse, the present study focused on the need to feel related, connected, and cared for by the coach in a team sport context.

Not much research has been conducted on perceptions of the motivational climate and perceptions of autonomy. Standage, Duda, and Ntoumanis (2003) who tested the impact of the motivational climate on the three needs found that perceptions of a task-involving motivational climate predicted only perceptions of autonomy. Treasure and Roberts (2001) had argued that the social environments that promote cues of personally based competence, and of beliefs that success is achieved through hard work, effort and a desire to learn then students are more likely to have greater control (autonomy) of their achievement in the PE class.

With regards to the need for competence, Kavussanu and Roberts (1996) found that tennis players' perceptions of a task-involving motivational climate were positively associated with perceptions of competence. Reinboth et al. (2004) showed that perceptions of the coach promoting effort and improvement predicted feelings of competence. Empirical evidence for the moderating effect of perceptions of competence to the relationship between motivational climate and various outcomes has been adequately provided (e.g., Liukkonen et al., 1998; Newton & Duda, 1999; Pensgaard & Roberts, 2000; Standage, Duda, & Ntoumanis, 2003b; Whitehead et al., 2004). These studies that have examined perceptions of the motivational climate in relation to only one of the three needs, namely perceptions of competence have found significant results in their majority.

Contrary, when studies have looked at the mediating effects of the three needs of autonomy, competence, and relatedness simultaneously, inconsistent results emerged. These studies have used different measures of the needs as well as for the perceptions of the motivational climate. For example in Standage, Duda, and Ntoumanis' (2003) study, the Education Physique Climate Motivational (EPCM) was used to measure perceptions of the motivational climate. This instrument taps slightly different dimensions of the climate than the PMCSQ-2, whereas in Kowal and Fortier's (2000) study an adapted and shortened version of the PMCSQ-1 was used. The EPCM does not measure cooperative learning and the PMCSQ-1's structure is limited to only the identification of a task- or ego-involving climate. Thus, due to the definition of what constitutes the motivational climate that each study adopted through the use of the questionnaires should make generalisation of the results of all these studies to be perceived with caution.

Need Satisfaction and Motivation. Results from the present study also showed that the satisfaction of the needs positively but moderately to low predicted the three types of intrinsic motivation consistently within all three social contexts, namely self-, meta-perceptions of the coach-athlete relationship, and motivational climate. Loadings ranged from .29 to .37. The variance explained in these three types of intrinsic motivation is not large, indicating that the social climates might have a direct effect on intrinsic motivation as it has been suggested and verified by other studies (Brunel, 1999; Newton & Duda, 1999; Kavussanu & Roberts, 1996; Seifriz, Duda, & Chi, 1992). Ryska and Yin (1999) found that individuals who perceived a task-involving climate, namely an environment that stressed personal progress and mastery, engaged in the activity out of the love of it, and considered the activity as an end in itself.

In such a context individuals participate for the sake of it and focus on the intrinsic rewards of learning. In contexts, wherein individuals' attention is drawn to social comparison, competition and outperforming others, intrinsic interest in the activity does not flourish (e.g., Boyd, Cronbech, & Yin, 1997; Walling & Duda, 1993). On the contrary, individuals perceive the achievement striving as a means to an end and the main end is the demonstration of superior ability in terms of winning. Other variables such as goal orientations might contribute to the prediction of intrinsic motivation as Ntoumanis (2001) and Kavussanu and Roberts (1996) found especially in male athletes. Overall, the positive prediction of the three types of intrinsic motivation by need satisfaction within these social environments is consistent with the tenets of AGT (Nicholls, 1989) and SDT (Deci & Ryan, 1985, 2000) and the mini theories of needs and motivation within the SDT framework. Thus, the present findings add support to the general body of AGT and SDT literature, that has demonstrated environments supporting learning, effort, personal improvement and self-referenced criteria of success, fosters intrinsic motivation in sport.

The next intrinsically regulated type of motivation, identified regulation, was positively but comparatively low predicted by the satisfaction of the needs within the three social environments (loadings from .20 to .21). This finding is again consonant with AGT and SDT that is athletes who satisfy their basic psychological needs in environments promoting effective coach-athlete relationships and task-involving motivational climates are more likely to absorb and embrace the values and meanings of sport as personally important. It would be very interesting though to examine if the

interaction of the social situation with individual characteristics such as goal orientations, and which combinations explain more variance in intrinsic and identified motivation.

Introjected regulation consistently failed to be predicted by the need satisfaction, whereas external regulation was borderly predicted with very little amount of variance explained by the needs in all social contexts. These results are in line with Standage et al.'s (2003) findings, where introjected regulation was not predicted by perceptions of the climate at all, but rather only by task-orientation.

Amotivation was negatively predicted by the needs, which is consistent with SDT, in all three social contexts (with loadings ranging from $-.19$ to $-.21$). Bivariate correlations reported in the descriptives section confirm these findings. Consistent with Standage et al.'s (2003) results, that motivational climate predicted more variance in the more self-determined types of motivation and less variance in the more extrinsically regulated types of motivation, the present study showed that athletes who were more satisfied relative to their needs within the coach-athlete relationship and motivational climate contexts revealed more intrinsic motivation and identified regulation and less extrinsic motivation and amotivation.

Although the present study provided further evidence on the impact of social contexts such as the motivational climate and the coach-athlete relationship on the satisfaction of the needs and on indices of motivation, there are some limitations that must be addressed. The Sport Motivation Scale (SMS) did not exhibit very high internal reliability and very good construct validity, thus the results generated in the present analysis from the SEM should be viewed with caution. The psychometric properties of the SMS might have contributed to the poor results of the structural models. One of the reasons that the support of the findings was not very strong might be attributed to the low explained variance by the items of the SMS. Future research should revise the questionnaire and refine its structure so that it reflects better the constructs it is assumed to measure. Specifically, the subscales of introjected and external regulation were found to be positively related to more self-determined types of motivation, which contradicts the theoretical tenets of SDT.

However, not only motivation suffers in contexts that do not satisfy athletes' basic psychological needs. One of the areas impacted by the dissatisfaction of needs is

athletes' optimal functioning and well-being. In the next two studies, factors indicating or closely related to optimal functioning and well being will be considered. More specifically, Study 3b investigated the impact of need satisfaction on role ambiguity, within relational and motivational contexts.

5.3 Study 3B: Social Contexts and Role Ambiguity. The Mediating role of Needs

5.3.1 Introduction

Role ambiguity has extensively been studied within the realm of organisation and management, and has been particularly associated with occupational stress (Jackson & Schuler, 1985; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Newton, & Keenan, 1987; Rizzo, House, & Lirtzman, 1970). Only very recently this concept has started to attract sport psychology researchers' attention. Role Ambiguity has been defined as a lack of clear information associated with a particular role (Kahn et al., 1964). It describes a situation in which the desired expectations sent to the focal person were vague, ambiguous, and/or unclear, thereby making it difficult for the person to fulfil the requirements. More specifically, it takes into account the lack of clear information about job responsibilities and expectations, including what should be done (expectation ambiguity), when it should be done (priority ambiguity), how it should be done (process ambiguity), and behaviors that should be exhibited (behavior ambiguity) (Kahn, et al., 1964; Sawyer, 1992; Singh, Verbke, & Rhoads, 1996).

Furthermore a 'role' refers to "...the sum total of expectations placed on the individual by supervisors, peers, subordinates, vendors, customers, and others, depending on the particular job" (Huse, 1975, p. 37). This also includes the individual's perception of his or her relationship to the organization. According to Banton (1965) a "role" can be defined as a set of norms or expectations applied to the incumbent of a particular position by the role incumbent and the various other role players (role senders) with whom the incumbent must deal to fulfil the obligations of their position.

Role ambiguity is problematic because lack of information about how to proceed with critical tasks leads to frustration; this frustration in turn results in tension. In addition, ambiguity is thought to impede the opportunity to improve performance and obtain rewards and thus reduces job satisfaction (Khan et al., 1964; Singh & Rhoads, 1991). Role ambiguity has been found to correspond with a variety of negative outcomes for those in an employment organisation, such as strain, burnout, lack of commitment, and productivity, and psychological symptoms. A meta-analysis of role ambiguity and role conflict by Shen (2005) showed that both of these constructs were negatively

correlated with professional job satisfaction. In another meta-analysis by Jackson and Schuler (1985) it was shown that task and job characteristics, individual characteristics, as well as leader consideration and initiating structure are determinants of role ambiguity; role ambiguity negatively correlates among others with autonomy, feedback from others, satisfaction, commitment, involvement, and performance and positively with tension, anxiety, and propensity to leave.

In the context of sport, two major approaches have been adopted in the study of role ambiguity. The first approach was developed by Eys and Carron (2001), who investigated different manifestations of role ambiguity. The first type refers to role ambiguity regarding scope of responsibilities and it reflects a lack of clear information about the breadth of one's responsibilities. The second type refers to a lack of clear information about the behaviours necessary to carry out the role and responsibilities attached to one's role. The third type refers to role evaluation and reflects a lack of clear information about the criteria and the manner by which their role is evaluated. The fourth type refers to a lack of clear information about the consequences of failing to perform the expected role responsibilities and behaviours. Role clarity has been conceptualized as the polar opposite of role ambiguity.

The second approach was developed by Beauchamp & Bray (2001). Beauchamp and Bray measured role ambiguity in two major behavioural contexts where formal role related responsibilities are more salient: offence and defence. The two groups of researchers combined their efforts in an integrated model developing the Role Ambiguity Scale (RAS) that examines the four manifestations of role ambiguity in the two major sport contexts and in terms of formal roles as it is experienced subjectively by athletes. Thus, the new approach operationalised role ambiguity as a multidimensional construct consisting of different types and different contexts. The RAS exhibited satisfactory validity and reliability properties, whereas the confirmatory factor analysis supported the four-factor structure solution both for offence and defence (Beauchamp, Bray, Eys, & Carron, 2002).

Role ambiguity in sport has been positively associated with pre-competition anxiety (Beauchamp, Bray, Eys, & Carron, 2003), and negatively associated with role efficacy and role performance, with role efficacy being a mediator in the prediction of role performance by role ambiguity (Beauchamp et al., 2002), athlete satisfaction (Eys, Carron, Bray, Beauchamp, 2003a) and team members' intention to retain group

membership in the future (Eys, Carron, Bray, Beauchamp, 2003b). In addition it was found that different types of ambiguity have differential outcomes.

Specifically, Beauchamp et al. (2003) examined the impact of the different types of role ambiguity on cognitive and somatic anxiety with a sample of 114 young field hockey players. Results showed that athletes who perceived lower role ambiguity in terms of offensive role responsibilities reported lower cognitive state anxiety. A very low percentage of the variance in somatic anxiety was explained by offensive role consequences ambiguity in the whole sample. When the authors conducted moderated regression analysis, they found that the variance explained in somatic anxiety was substantial in male athletes and insignificant in females. Role ambiguity manifestations referring to the defensive context did not correlate to any type of anxiety. Beauchamp et al. also found that the athletes placed more emphasis on the development of their offensive role responsibilities, spending more time each week practicing them compared to defensive role responsibilities. The inconsistent results in terms of gender influences might be attributable to the sample size employed in this study. Taken as a whole, results confirm the hypotheses, although no information is provided regarding the interpretation of this relationship by the athletes, as it might have positive consequences on their performance.

Moving from role ambiguity's effects on negative outcomes to positive affective outcomes, Eys, Carron, Bray, and Beauchamp (2003b) explored the influence of role ambiguity on 101 university soccer players' satisfaction. Results showed that role ambiguity, and more specifically role ambiguity related to offence only, was negatively related to athletes' satisfaction due to the greater amount of responsibilities and decisions attached to the offensive context (Eys & Carron, 2001). Consistent with previous results (Beauchamp et al., 2002; Beauchamp et al., 2003) ambiguity related to scope of responsibilities was the best predictor of satisfaction.

Role ambiguity effects on role efficacy and role performance have been explored in a study with 271 young male rugby players (Beauchamp et al., 2002). Results showed that ambiguity related to scope of responsibilities was the primary predictor of role efficacy beliefs. Furthermore, ambiguity related to scope of responsibilities was the major predictor of role performance for both offence and defence. An explanation of the emergence of the ambiguity related to role responsibilities as the best predictor was provided on the basis that since athletes that are unclear as to which are their

responsibilities were they are more likely to feel inefficient and insufficient and engage in inappropriate task-related strategies. The final result of this study revealed a mediation effect of role efficacy in explaining the role ambiguity's influence on role performance.

Another study looked at the impact of role ambiguity on role efficacy in 33 intact rugby and hockey secondary school teams (Beauchamp et al., 2002). Using multilevel modelling Beauchamp et al. found that role ambiguity accounted for a greater amount of variance in role efficacy on offence and defence at the individual level than the group level. Emphasis was laid on the fact that the relationship between role ambiguity and role efficacy varied across teams, nevertheless it was perceived as positive by all teams with a similar magnitude. These results are encouraging because of their implications for applied work. Possible interventions can take place at both an individual and team level aiming at improving the team members' clarity.

A general observation of the last four studies reviewed concentrates on the type of sports selected for investigation (rugby, soccer, and hockey), and raises the issue of generalisation of the results to other team sports. The level of distinction between offensive and defensive roles varies among several types of team sports. For example in American Football these two roles are totally distinctive, as one team includes two sub-teams, one for offence and one for defence, with coaches coaching exclusively only offence or defence. On the other hand, other team sports such as rowing (4 or 8 rowers in a boat) do not include at all offensive and defensive roles.

It was mentioned earlier that research in sport psychology has concentrated in examining the outcomes of role ambiguity, and paid little attention on role ambiguity's antecedents. Beauchamp (2005) in his applied model for facilitating role enactment identified situational, coach-oriented and athlete-oriented factors that are likely to affect role ambiguity. It is important to investigate the contribution of these factors to various manifestations of role ambiguity because researchers can "focus on prevention rather than cure as primary means of intervention" (Beauchamp et al., 2005, p. 7). Research thus far, has focused on the role of the coach and more specifically, coaches' behaviours of training and instruction and positive feedback in predicting players' role ambiguity. Beauchamp et al. (2005) found that training and instruction accounted for significance variation in offensive role evaluation ambiguity and offensive and defensive ambiguity pertaining to consequences of failing to fulfil role

responsibilities. Coach's positive feedback was not related to any of the types of RA. This pattern of results was identified only for nonstarters. The authors justified the results in that starters did not receive coach leadership as a source of role ambiguity, possibly due to the greater opportunities to practice various role responsibilities compared to the nonstarters.

Although this study provided significant insight into the role of the coach in predicting athletes' role ambiguity, it is restricted due to the limited scope of the leadership approach. Taking into consideration only the coaches' behaviour, and especially only two facets of it one cannot determine the influence of the coach- initiated structure and environment. It has been suggested that the not only the coach's behaviours, but rather their feelings and thoughts alongside with athletes' behaviours, feelings and thoughts should be considered, in influencing several affective, cognitive and behavioural outcomes, as these elements interact to produce an effective or ineffective coach-athlete relationship. Athletes and coaches will develop a network within this environment and relationship and depending on the quality of the social athletic situation the athletes will perceive their roles with different degrees of clarity/ambiguity. Moreover, the motivational cues inherent in the climate initiated by the coach should play an important role on how athletes perceive their roles in their teams. In Duda & Balaguer's (1999) model of leadership and motivation, motivational climate was hypothesised to be an antecedent of role ambiguity/clarity.

Thus the aim of the present study was to examine the degree to which the social situation, in terms of the coach-athlete relationship and the motivational climate would affect athletes' perceptions of role ambiguity/clarity, through the mediational role of need satisfaction. Specifically, it was hypothesised that:

- a) Coach-athlete relationship would be negatively associated with role ambiguity when athletes' needs for autonomy, competence and relatedness are satisfied. On the other hand, coach-athlete relationship would be positively associated with role ambiguity when athletes' needs for autonomy, competence and relatedness are thwarted.
- b) Task-involving motivational climate would be negatively associated with role ambiguity when athletes' needs for autonomy, competence and relatedness are satisfied. Conversely, task-involving motivational climate would be positively

associated with role ambiguity when athletes' needs for autonomy, competence and relatedness are thwarted.

c) Ego-involving motivational climate would be negatively associated with role ambiguity when athletes' needs for autonomy, competence, and relatedness will have been satisfied. Additionally, ego-involving motivational climate would be positively associated with role ambiguity when athletes' needs for autonomy, competence, and relatedness are thwarted.

5.3.2 Methodology

5.3.2.1 Participants

Seven hundred and fifty five (755) university students participated in this study. Specifically, this study involves further analyses with the same data as in Study 3A. Participants in study 3B comprised 87% of the sample used in Study 3A. Specifically, the sample comprised 477 (63%) male athletes and 278 (37%) female athletes. The participants performed in a variety of team sports at university level: rugby (N=214, 28%), football (N=67, 9%), hockey (N=30, 4%), volleyball (N=33, 4%), basketball (N=58, 8%), rowing (N=111, 15%), ultimate Frisbee (N=39, 5%), American football (N=66, 9%), netball (N=70, 9%), ice-hockey (N=22, 3%), lacrosse (N=24, 3%), handball (N=6, 1%), canoe polo (N=5, 1%), polo (N=3, .04%), cricket (N=2, .03%), baseball (N=5, 1%). Their age ranged from 18 to 41 years (M=21.48, SD=2.50). The typical university athlete's age ranges from 18 years old when he/she enters the university to 21 years old when he/she graduates. University athletes that are older than 22 years old are characterised as mature student athletes, with the majority being postgraduate students. In the present study, 457 students fell in the first category (typical students) and 289 students fell in the second category (mature students). The athletes' reported experience associated with their sport ranged from 0 to 30 years.

For the male sample the age ranged from 18 to 41 (M= 21.76, SD= 2.80). For the female sample the age ranged from 18 to 35 (M= 21, SD= 1.80). For the male sample the experience of their sport ranged from 0 to 30 years (M = 6.89, SD = 5.54). For the female sample the experience ranged from 1 month to 18 years (M = 5.26, SD = 4.35). The athletes' relationship with their team ranged from 0 to 14 years. (M=1.19, SD=1.56). The expected relationship duration with one's team in the university

context is expected to range from 0 to 3 years for the typical students. For the mature students relationship duration could last up to 7 or 8 years depending due to following a postgraduate career. In the present study 697 students reported having being with their team for up to 3 years, 55 reported having being with their team up to 8 years, and 3 athletes up to 14 years.

The male athletes reported having been with their team from 0 to 14 years ($M=1.31$, $SD = 1.73$). The female athletes reported having been with their team from 1 month to 6 years ($M=1.31$, $SD = 1.73$). Athletes relationship with their coach ranged from 0 to 7 years ($M=.69$, $SD=1.00$). The time that the male athletes had spent with their coach ranged from 0 to 7 years ($M=.82$, $SD=1.07$), whereas for the female athletes ranged from 0 to 4 years ($M=.46$, $SD=.86$). The hours of practice per week that the athletes devoted for training ranged from 0 to 21 hours ($M=5.25$, $SD=3.96$). For the male sample the hours that they spent in practicing their sport ranged from 0 to 21 hours ($M=5.36$, $SD=4.00$) whereas for the females ranged from 1 to 21 hours ($M=5.06$, $SD=3.90$).

5.3.2.2 Procedures

Same procedures apply as in study 3A.

5.3.2.3 Instrumentation

Coach-Athlete Relationship: The Coach-Athlete Relationship Questionnaire/ self-perceptions (CART-Q self-perceptions: Jowett & Ntoumanis, 2004) was employed to measure athletes' self-perceptions of closeness, commitment, and complementarity. The Coach Athlete Relationship Questionnaire/meta-perceptions (CART-Q meta-perceptions: Jowett, 2002) was employed to measure athletes' meta-perceptions of closeness, commitment, and complementarity. A more detailed description of the CART-Q questionnaires and reliabilities was provided at Chapter II, Literature Review, pp. 78-79, and Chapter 5, Study 1, p.220.

Motivational Climate: Motivational Climate was assessed by the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2: Newton, Duda, & Yin, 2000), which comprises two higher order dimensions, labelled task- and ego-involving climate. A more detailed description of the questionnaire was presented at Chapter II, Literature Review, pp. 33-37, Chapter 5, Study 1, p. 220.

Need Satisfaction: A 6-item modified version of the Need Satisfaction Scale (NSS; La Guardia, Ryan, Couchman, & Deci, 2000) was used to assess participants' perceptions of a target figure's contribution to the satisfaction of their basic needs. A more detailed description of the questionnaire was presented at Chapter 5, Study 1, pp. 221-222.

Role Ambiguity: A modified version of the Role Ambiguity Scale (RAS; Beauchamp et al., 2002) was employed. A total number of 12 items was retained to assess the degree to which athletes perceive that their roles and responsibilities in their team are ambiguous. The original RAS comprised 4 subscales measuring the degree of ambiguity and lack of clarity associated with (a) the scope of personal responsibilities (e.g., I understand the extent of my responsibilities), (b) the behaviours necessary to carry out those responsibilities (e.g., I understand what adjustments to my behaviour need to be made to carry out my role), (c) how performance associated with those responsibilities is evaluated (e.g., I understand the criteria by which my role responsibilities are evaluated), and (d) the consequences of a failure to carry out successfully those responsibilities (e.g., It is clear to me what happens if I fail to carry out my role responsibilities). The four subscales comprised 5 items each for offence and 5 items each for defence resulting in a 40-item questionnaire. Responses are evaluated based on a 9-point response scale anchored by 1 (strongly disagree) and 9 (strongly agree). Due to the nature of the sample of the present study, which comprised team sports such as rowing, where the offensive and defensive context is not relevant 20 items were retained measuring role ambiguity irrespective of the context. Based on the controversy of using reverse scored items in self-report measures and previous experience, only the positively worded items were retained. Nunnally (1967) recommended the use of negatively and positively worded items in an attempt to reduce response set or response bias. Response set occurs when respondents fail to discriminate among the items and respond to every question in the same way (e.g., circle 5's on a 7 point Likert scale). A tendency has been reported though, for the negatively worded items to load on a separate factor (Kelloway, Catano, & Southwell, 1992; Roberts, Lewinsohn, & Seeley, 1993). There is strong evidence to suggest that when a small percentage (as little as 10%) of respondents is careless separate factor structures could emerge as a result of positively and negatively worded items (Schmitt & Stults, 1985). Finally, 5 more items were excluded due to

the very similar wording (e.g., “It is clear to me what happens if I fail to carry out my role responsibilities” and “I understand the consequences of failing to carry out my role responsibilities”). The modified version for RAS comprised 3 items for each of the four subscales, resulting in a 12-item questionnaire. For the present study Cronbach alpha for the subscale pertaining to scope of responsibilities was .87, for the role behaviour ambiguity subscale .84, for the role evaluation ambiguity was .88 and for the role consequences ambiguity was .84, whereas reliability for the whole scale was .95.

5.3.3 Results

5.3.3.1 Descriptive Statistics

Table 20 contains mean, standard deviation, skewness, and kurtosis scores for each of the subscales of the questionnaires employed. All mean scores were relatively high for the 3 Cs (self- and meta-perceptions) and for the task-involving climate (co-operative learning, effort/improvement, and important role), whereas mean scores for ego-involving climate (punishment for mistakes and unequal recognition) were low to moderate. Perceptions of ego-involving climate were low to moderate. Athletes scored relatively high on the need satisfaction, and role ambiguity scales.

Table 20: Descriptive Statistics of the subscales used in study 3b

| | Mean | SD | Skewness | Kurtosis |
|--------------------------------|------|------|----------|----------|
| CART-Q/self-perceptions | | | | |
| 1. Self-Closeness | 5.41 | 1.20 | -1.14 | 1.35 |
| 2. Self-Commitment | 4.71 | 1.19 | -.68 | .49 |
| 3. Self-Complementarity | 5.30 | 1.06 | -.98 | 1.39 |
| CART-Q/meta-perceptions | | | | |
| 1. Meta-Closeness | 4.87 | 1.05 | -.47 | .42 |
| 2. Meta-Commitment | 4.38 | 1.13 | -.39 | .01 |
| 3. Meta-Complementarity | 4.92 | 1.02 | -.52 | .63 |
| NSS | | | | |
| 1. Need Satisfaction | 4.70 | .98 | -.45 | .52 |
| PMCSQ-2 | | | | |
| 1. Cooperative Learning | 4.07 | .59 | -.76 | 1.40 |
| 2. Effort/Improvement | 3.95 | .68 | -.64 | .66 |
| 3. Important Role | 3.86 | .73 | -.55 | .22 |
| 4. Punishment for mistakes | 2.55 | .93 | .36 | -.61 |
| 5. Unequal recognition | 2.77 | .93 | -.02 | -.77 |
| RAS | | | | |
| 1. RA-responsibilities | 6.49 | 1.48 | -.64 | .69 |
| 2. RA-behaviour | 6.49 | 1.38 | -.63 | 1.00 |
| 3. RA-evaluation | 6.15 | 1.54 | -.50 | .49 |
| 4. RA-consequences | 6.34 | 1.54 | -.38 | -.00 |

Note: Response scale for the CART-Q/self- and meta-perceptions ranged from 1 to 7; for the NSS ranged from 1 to 7; for the PMCSQ-2 ranged from 1 to 5; and for RAS ranged from 1 to 9.

5.3.3.2 Gender Differences

MANOVA results will not be reported for CART-Q, PMCSQ-2, and NSS as they have been reported at Chapter 5, Study 1, p. 228. One-way MANOVA was conducted in order to test for gender differences (i.e., the manner to which male and female athletes perceive role ambiguity). MANOVA showed non-significant multivariate main effects of gender for perceptions of role ambiguity Wilk's $\Lambda=0.99$, $F(4, 750) = 3.36$, $p > .05$.

5.3.3.3 Bivariate Correlations

Simple bivariate correlations revealed that the CART-Q/self-perceptions and the CART-Q/meta-perceptions subscales were positively and moderately related to the three needs, the four types of role ambiguity and task climate and negatively related to ego climate (see Table 21). Punishment for mistakes was not related to self-Commitment, meta-commitment, effort/improvement, and role ambiguity subscales. Similarly unequal recognition was not related to role evaluation ambiguity and role consequences ambiguity. Correlations between the subscales of each questionnaire were at the expected direction.

Table 21: Bivariate Correlations among all the subscales used in Study 3b

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|-----------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 1) Self-Closeness | | .79*** | .83*** | .66*** | .61*** | .67*** | .49*** | .45*** | .51*** | .36*** | -.09** | -.28*** | .37*** | .37*** | .33*** | .28*** |
| 2) Self-Commitment | | | .72*** | .64*** | .71*** | .62*** | .53*** | .42*** | .49*** | .34*** | -.03 | -.24*** | .36*** | .37*** | .33*** | .26*** |
| 3) Self-Complementarity | | | | .67*** | .57*** | .75*** | .53*** | .45*** | .48*** | .35*** | -.12*** | -.25*** | .39*** | .40*** | .35*** | .32*** |
| 4) Meta-Closeness | | | | | .78*** | .87*** | .66*** | .36*** | .36*** | .31*** | -.16*** | -.25*** | .42*** | .40*** | .38*** | .30*** |
| 5) Meta-Commitment | | | | | | .71*** | .64*** | .33*** | .36*** | .28*** | -.05 | -.21*** | .39*** | .37*** | .34*** | .27*** |
| 6) Meta-Complementarity | | | | | | | .63*** | .39*** | .40*** | .32*** | -.13*** | -.22*** | .41*** | .40*** | .36*** | .30*** |
| 7) Need Satisfaction | | | | | | | | .35*** | .34*** | .33*** | -.12*** | -.25*** | .43*** | .42*** | .41*** | .33*** |
| 8) Cooperative Learning | | | | | | | | | .70*** | .59*** | -.14*** | -.23*** | .36*** | .35*** | .29*** | .29*** |
| 9) Effort/Improvement | | | | | | | | | | .62*** | -.04 | -.25*** | .35*** | .36*** | .30*** | .29*** |
| 10) Important Role | | | | | | | | | | | -.11** | -.30*** | .33*** | .31*** | .23*** | .24*** |
| 11) Punishment for mistakes | | | | | | | | | | | | .58*** | -.05 | -.04 | .01 | .04 |
| 12) Unequal Recognition | | | | | | | | | | | | | -.10** | -.09* | -.05 | -.00 |
| 13) RA Responsibilities | | | | | | | | | | | | | | .86*** | .71*** | .70*** |
| 14) RA Behaviour | | | | | | | | | | | | | | | .75*** | .74*** |
| 15) RA Evaluation | | | | | | | | | | | | | | | | .72*** |
| 16) RA Consequences | | | | | | | | | | | | | | | | |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

5.3.3.4 Confirmatory Factor Analysis of the CART-Qs

As a first of SEM the factorial structured of the questionnaires was examined. CFA was not conducted for the CART-Q, PMCSQ-2, and NSS as their factorial structure was reported in Study 3A.

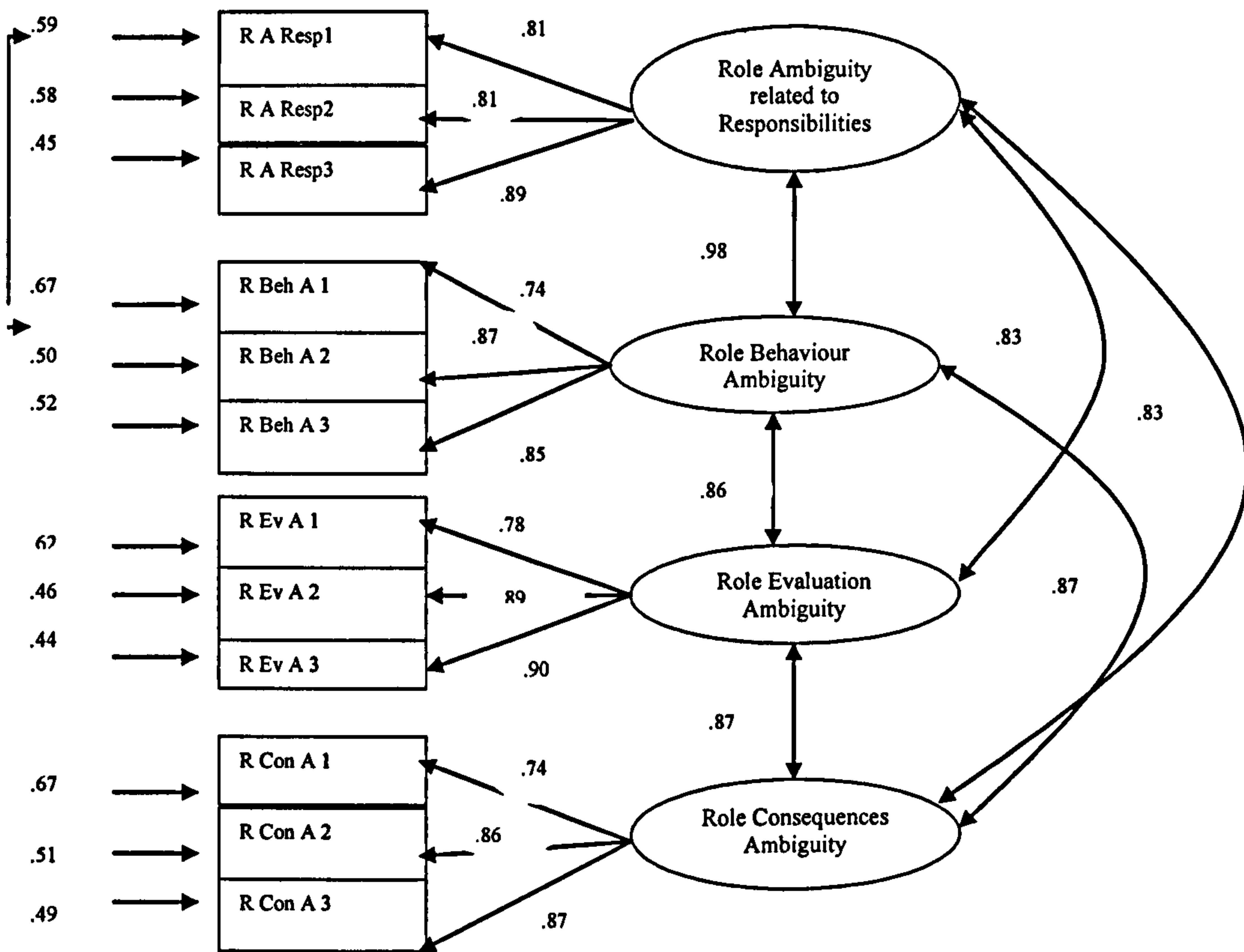
RAS. A four first-order factor solution was tested for the Role Ambiguity Scale as recommended by Beauchamp et al. (2002).

The fit indexes utilised to assess the capability of the model to fit the data adequately included the same indexes utilised in the previous study, namely, the Satorra-Bentler scaled χ^2 (S-B χ^2), the robust Comparative Fit Index (CFI), the Non-Normed Fit Index (NNFI), the Standardised Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA).

Model Assessment.

Role Ambiguity Scale: Mardia's coefficient was high (51.20) indicating multivariate non-normality, thus robust statistics were employed. A four first-order factor structured was tested. Results ($\chi^2 = 564.863$, $p < .001$, CFI=.93, NNFI = .91, SRMR = .05, RMSEA= .12 (.11, .13) showed that the model fits the data moderately. Item loadings were high and ranging from .74 to .90, whereas factor correlations ranged from .83 to .87 and were statistically significant (see Figure 27).

Figure 27: The four first-order correlated factor model for RAS.



Note: All parameters are standardized and significant ($p < .001$)

Table 22 summarises the results from the CFA for study 3b.

Table 22: Fit indices for Confirmatory Factor Analysis in study 3b

| SCALE | χ^2 | NNFI | CFI | SRMR | RMSEA with 90% CI |
|---|-----------------------|------|-----|------|-------------------|
| RAS (4 factors correlated, minus identification 1-item) | $\chi^2 (48)=564.863$ | .91 | .93 | .05 | .12 (.11, .13) |

5.3.3.5 Structural Equation Models

The second step in SEM analysis, once the factor structure of each instrument utilised in the analysis has been confirmed, is the building of a full structural model. Due to the significant complexity that a model including three hierarchical and two first-order factor structures would reveal, it was decided that three models would be tested, one for each social factor (e.g., self-perceptions of the coach-athlete relationship, meta-perceptions of the coach-athlete relationship, and motivational climate) that served as

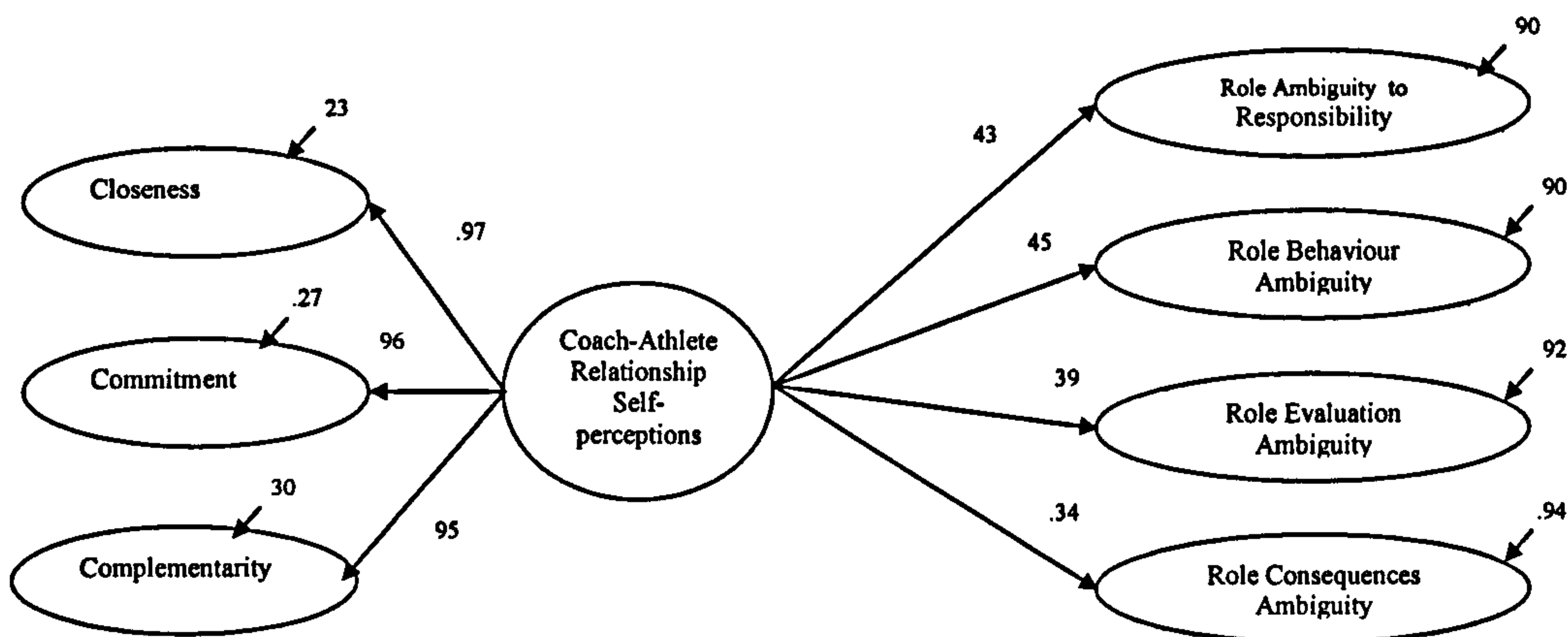
a determinant of need satisfaction and indices of motivation, as in the previous study. Thus, the following three SEM models were tested for each of the contextual factors:

- a) It was hypothesised that the athletes' self-perceptions of the coach-athlete relationship would predict positively all types of role ambiguity through the satisfaction of their basic needs.
- b) It was hypothesised that athletes' meta-perceptions of the coach-athlete relationship would predict positively all types of role ambiguity through the satisfaction of their basic needs.
- c) It was hypothesised that athletes' perceptions of the task-involving motivational climate would predict positively and perceptions of the ego-involving motivational climate would negatively predict all types of role ambiguity through the satisfaction of their basic needs.

Results

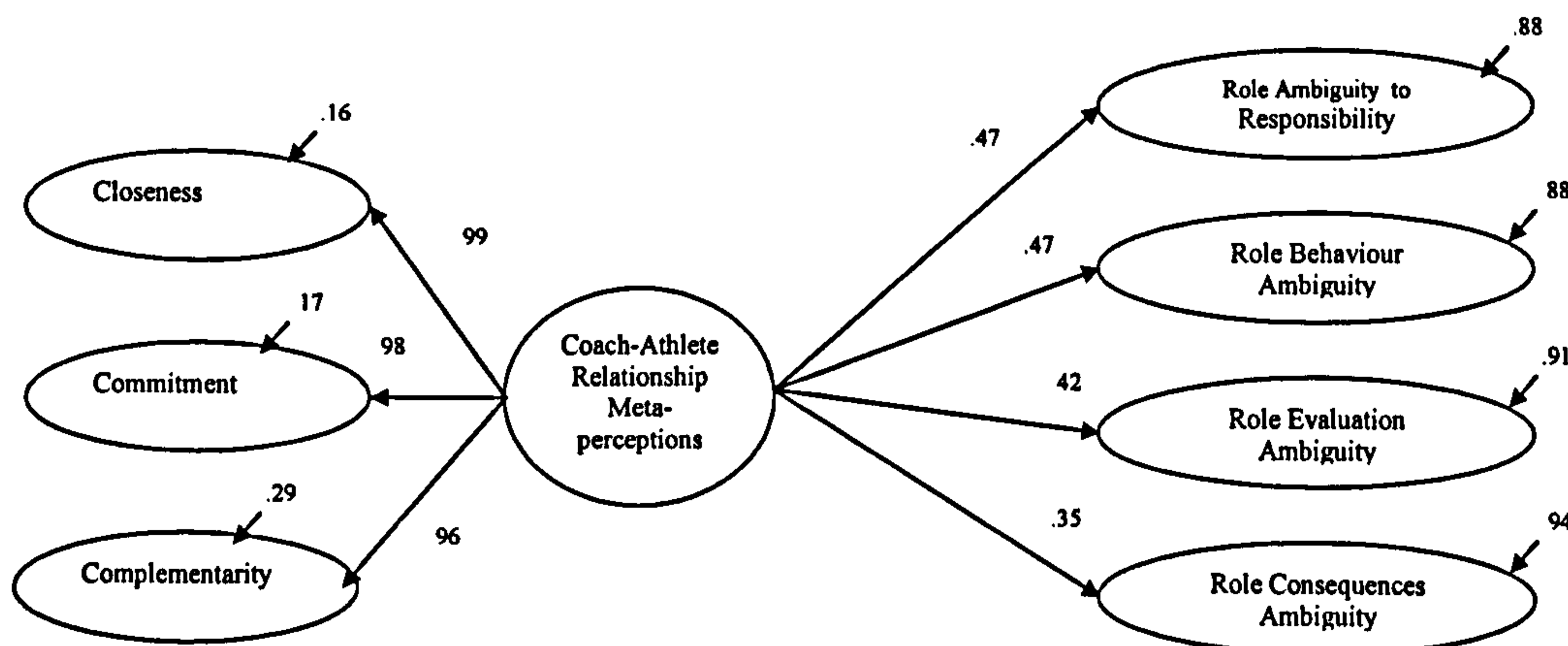
The direct effects model between self-perceptions of the coach-athlete relationship and role ambiguity showed a good fit to the data (Sattora-Bentler χ^2 (217) = 833.8310, $p < .001$, CFI = .92, NNFI = .91, SRMR = .04, RMSEA = .06 (.06, .07). All paths were significant and in the expected direction. Self-perceptions of the coach-athlete relationship predicted positively all four types of role ambiguity. At this point it would be helpful to remind that greater scores in role ambiguity denote role clarity. Correlations among the four types of role ambiguity ranged between .76 and .98. Figure 28 shows the loadings and paths for model depicting the influence of the self-perceptions of the coach-athlete relationship on role ambiguity.

Figure 28: Direct Model of self-perceptions of the coach-athlete relationship and role ambiguity



The direct effects model between meta-perceptions of the coach-athlete relationship and role ambiguity showed a good fit to the data (Sattora-Bentler χ^2 (217) = 761.0692, $p < .001$, CFI=.94, NNFI = .93, SRMR = .04, RMSEA= .06 (.05, .06). All paths were significant and in the expected direction. Meta-perceptions of the coach-athlete relationship predicted positively all four types of role ambiguity. Correlations among the four types of role ambiguity ranged between .75 and .98. Figure 29 shows the loadings and paths for model depicting the influence of the meta-perceptions of the coach-athlete relationship on role ambiguity.

Figure 29: Direct Model of meta-perceptions of the coach-athlete relationship and role ambiguity



The direct effects model between perceptions of motivational climate and role ambiguity showed a good fit to the data (Sattora-Bentler χ^2 (577) = 1403.0486, $p < .001$, CFI=.93, NNFI = .92, SRMR = .06, RMSEA= .04 (.04, .05). All paths were

significant and in the expected direction. Perceptions of a more task-involving motivational climate predicted positively all four types of role ambiguity. Perceptions of a more ego-involving motivational climate marginally and positively predicted amotivation, whereas they did not predict any other type of role ambiguity. Correlations among the four types of role ambiguity ranged between .77 and .98. Figure 30 shows the loadings and paths for model depicting the influence of the meta-perceptions of the coach-athlete relationship on role ambiguity.

Figure 30: Direct Model of Motivational Climate and Role Ambiguity

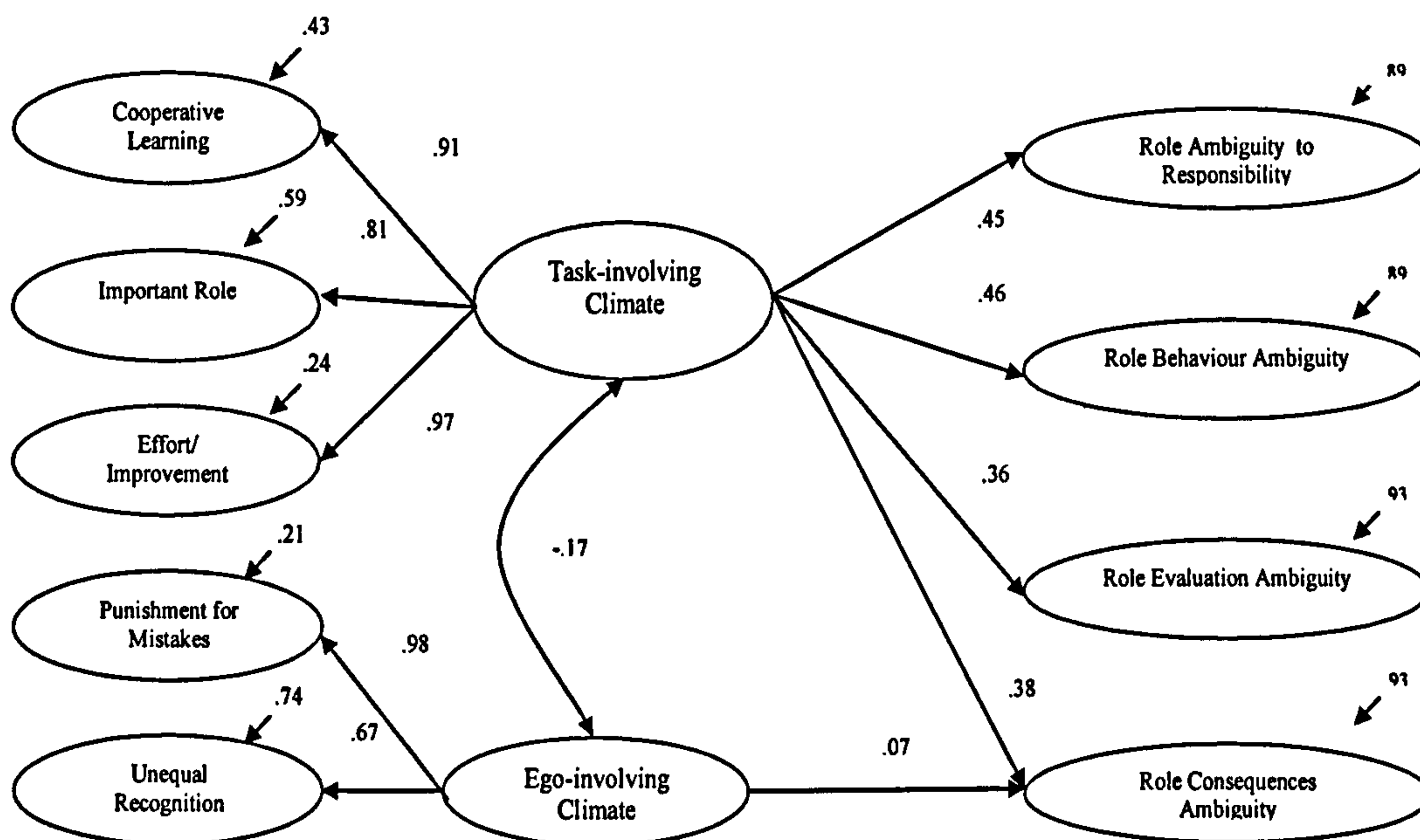


Table 23 shows the results from the direct model analyses.

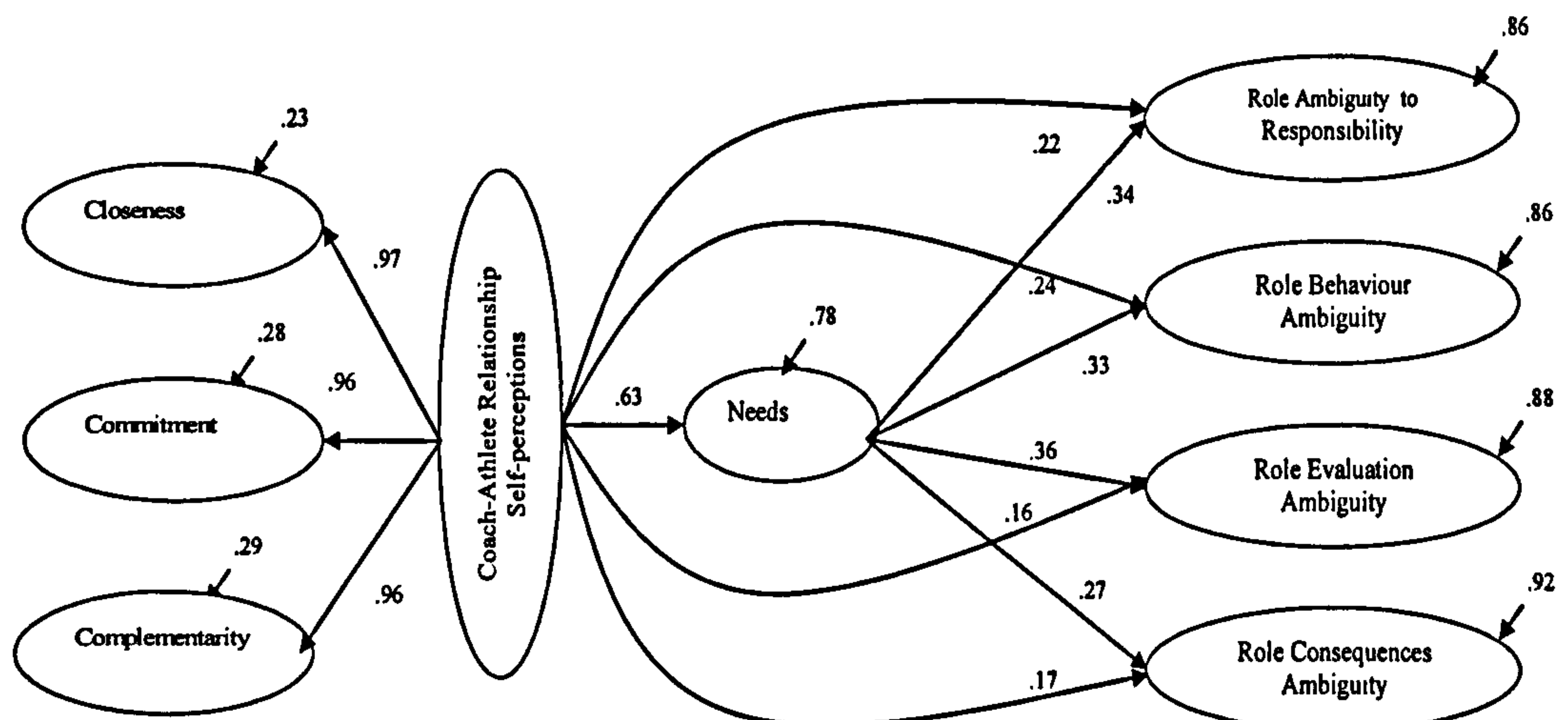
Table 23: Results from direct effect SEModels for Study 3B

| INDEPENDENT VARIABLE | χ^2 | CFI | NNFI | SRMR | RMSEA with 90% CI |
|----------------------|--------------------------|-----|------|------|-------------------|
| CART-Q/s | $\chi^2 (217)= 833.8310$ | .92 | .91 | .04 | .06 (.06, .07) |
| CART-Q/m | $\chi^2 (217)= 761.0692$ | .94 | .93 | .04 | .06 (.05, .06) |
| PMCSQ-2 | $\chi^2 (577)=1403.0486$ | .93 | .92 | .06 | .04 (.04, .05) |

Once the first condition for mediational analysis, that is the demonstration of a significance influence from the independent variable to the outcome variable, has been satisfied, the models were extended to include a predictor variable.

Self-perceptions of the coach-athlete relationship. Results from the SEM analyses showed that the first model in which CART-Q/s served as the predictor, the four types of role ambiguity as outcomes and need satisfaction as the mediator, approached a reasonable fit to the data: (Sattora-Bentler χ^2 (359)= 1246.3550, $p < .001$, CFI=.91, NNFI = .90, SRMR = .05, RMSEA= .06 (.05, .06). Figure 31 shows the loadings and paths for the mediational model.

Figure 31: Mediational Model for self-perceptions of the coach-athlete relationship, role ambiguity, and need satisfaction



To confirm the mediational role of need satisfaction the path from self-perceptions of the coach-athlete relationship to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled χ^2 (360) = 1446.4790, $p < .001$, CFI= .89, NNFI = .88, SRMR = .16, RMSEA= .06 (.06, .07). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2$ (1, $n=755$) = 200.1240 $p < .001$).

Results suggested that need satisfaction mediated partially the relationship between self-perceptions of the coach-athlete relationship and role ambiguity. When controlling for need satisfaction, the direct effect of self-perceptions of the coach-athlete relationship on Role Ambiguity related to Responsibilities dropped from .555,

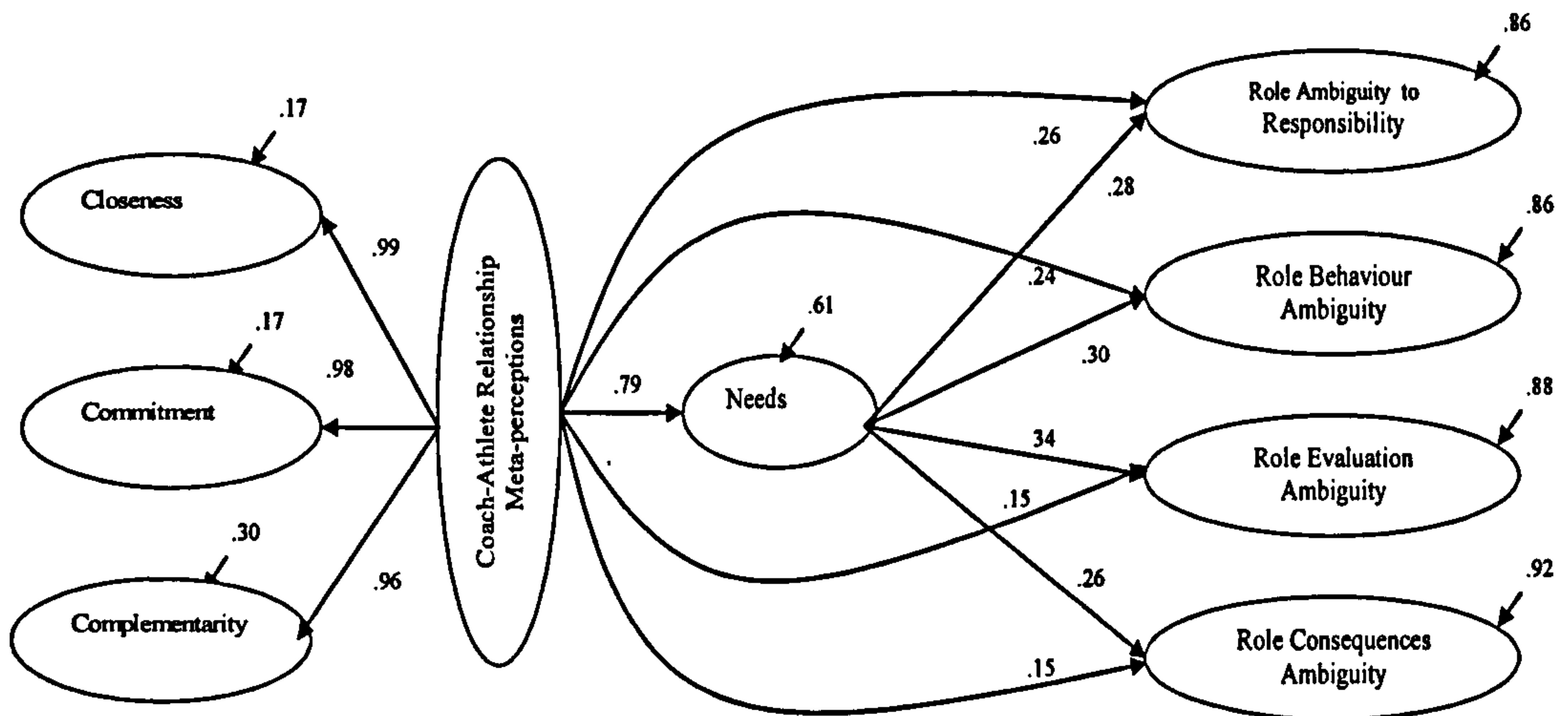
se=.052, t=10.597 to .286, se=.064, t=4.489. The same pattern for the direct effect of self-perceptions of the coach-athlete relationship was monitored for all types of role ambiguity: for Role Behaviour Ambiguity the path dropped from .517, se=.048, t=10.714 to .274, se=.059, t=4.647; for Role Evaluation Ambiguity the path dropped from .496, se=.052, t=9.609 to .204, se=.065, t=3.153; and for Role Consequences Ambiguity the path dropped from .445, se=.054, t=8.242 to .225, se=.069, t=3.236. Table 24 shows the total, direct, and indirect paths obtained from the mediational model.

Table 24: Total, Direct, and Indirect effects for self-perceptions of the coach-athlete relationship on role ambiguity

| | | Total effects of the Coach-athlete relationship/ self- perceptions | Direct effects of the Coach-athlete relationship/ self- perceptions | Indirect effects of the Coach-athlete relationship/ self- perceptions |
|-------------------------------------|----|---|--|--|
| Role Ambiguity to Responsibility | | .555 | .286 | .269 |
| | se | .052 | .064 | .044 |
| | t | 10.597* | 4.489* | 6.060* |
| Role Behaviour Ambiguity | | .517 | .274 | .243 |
| | se | .048 | .059 | .041 |
| | t | 10.714* | 4.647* | 5.953* |
| Role Evaluation Ambiguity | | .496 | .204 | .293 |
| | se | .052 | .065 | .046 |
| | t | 9.609* | 3.153* | 6.415* |
| Role Consequences Ambiguity | | .445 | .225 | .221 |
| | se | .054 | .069 | .047 |
| | t | 8.242* | 3.236* | 4.711 |

Meta-perceptions of the coach-athlete relationship. For the second model in which the CART-Q/m served as the independent variable results showed that the model fit the data adequately well: (Sattora-Bentler χ^2 (359)= 1091.3397, p< .001, CFI=.93, NNFI = .92, SRMR = .04, RMSEA= .05 (.05, .06). A strong path connected need satisfaction with athletes' meta-perceptions of the coach-athlete relationship (see Figure 32). Correlations among the four types of role ambiguity ranged between .74 and .98. Figure 32 shows the loadings and paths for the mediational model.

Figure 32: Mediational Model of meta-perceptions of the coach-athlete relationship, need satisfaction and role ambiguity



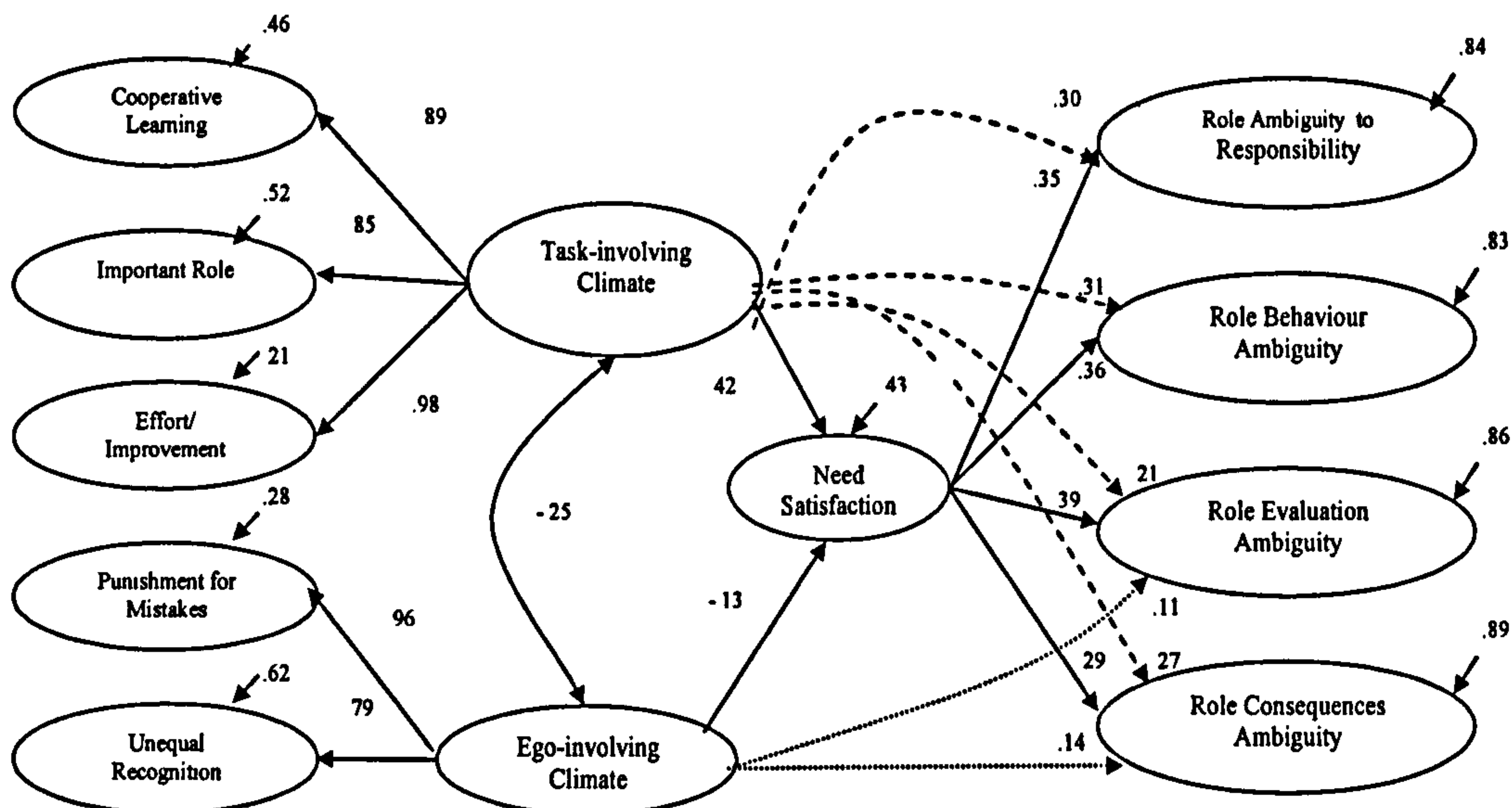
To confirm the mediational role of need satisfaction the path from meta-perceptions of the coach-athlete relationship to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled $\chi^2(360) = 1445.0011$, $p < .001$, CFI = .90, NNFI = .88, SRMR = .19, RMSEA = .06 (.06, .07). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2(1, n=755) = 353.6614$, $p < .001$).

Results suggested that need satisfaction mediated partially the relationship between meta-perceptions of the coach-athlete relationship and role ambiguity. When controlling for need satisfaction, the direct effect of meta-perceptions of the coach-athlete relationship on Role Ambiguity related to Responsibilities dropped from .605, $se = .053$, $t = 11.521$ to .328, $se = .088$, $t = 3.730$. The same pattern for the direct effect of self-perceptions of the coach-athlete relationship was monitored for all types of role ambiguity: for Role Behaviour Ambiguity the path dropped from .546, $se = .048$, $t = 11.306$ to .275, $se = .081$, $t = 3.381$; for Role Evaluation Ambiguity the path dropped from .544, $se = .052$, $t = 10.556$ to .196, $se = .089$, $t = 2.199$; and for Role Consequences Ambiguity the path dropped from .463, $se = .054$, $t = 8.573$ to .193, $se = .096$, $t = 2.016$. Table 25 shows the total, direct, and indirect paths obtained from the mediational model.

Table 25: Total, Direct, and Indirect effects of meta-perceptions of the coach-athlete relationship on role ambiguity

| | | Total effects of the Coach-athlete relationship/ meta- perceptions | Direct effects of the Coach-athlete relationship/ meta- perceptions | Indirect effects of the Coach-athlete relationship/ meta- perceptions |
|-------------------------------------|----|---|--|--|
| Role Ambiguity to Responsibility | | .605 | .328 | .277 |
| | se | .053 | .088 | .072 |
| | t | 11.521* | 3.730* | 3.849* |
| Role Behaviour Ambiguity | | .546 | .275 | .271 |
| | se | .048 | .081 | .067 |
| | t | 11.306* | 3.381* | 4.043* |
| Role Evaluation Ambiguity | | .544 | .196 | .348 |
| | se | .052 | .089 | .075 |
| | t | 10.556* | 2.199* | 4.672* |
| Role Consequences Ambiguity | | .463 | .193 | .269 |
| | se | .054 | .096 | .079 |
| | t | 8.573* | 2.016* | 3.408* |

Perceptions of Motivational Climate. For the third model in which the PMCSQ-2 served as a predictor results showed that the model fit the data adequately well: Sattora-Bentler χ^2 (790) = 1698.1890, $p < .001$, CFI=.93, NNFI = .93, SRMR = .05, RMSEA= .04 (.04, .04). Correlations among the four types of role ambiguity ranged between .74 and .98. Lagrange Multiplier Test showed that the path from the ego-involving climate factor to the role ambiguity related to responsibilities and role behaviour ambiguity was not significant. Thus, the model was specified by deleting the two paths and was rerun. The model fit the data well: Sattora-Bentler χ^2 (792) = 1701.0469, $p < .001$, CFI=.93, NNFI = .93, SRMR = .05, RMSEA= .04 (.04, .04). The final model can be seen in Figure 33.

Figure 33: Mediated Model of Motivational Climate, need satisfaction, and role ambiguity

To confirm the mediational role of need satisfaction the path from perceptions of the motivational climate to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled $\chi^2(792) = 1806.4855$, $p < .001$, CFI = .92, NNFI = .92, SRMR = .09, RMSEA = .04 (.04, .04). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2(2, n=755) = 108.2965$, $p < .001$).

Results suggested that need satisfaction mediated partially the relationship between motivational climate and role ambiguity. When controlling for need satisfaction, the direct effect of task-involving motivational climate on Role Ambiguity related to Responsibilities dropped from .578, $se = .056$, $t = 10.243$ to .389, $se = .057$, $t = 6.776$. The same pattern for the direct effect of task-involving motivational climate was monitored for all types of role ambiguity: for Role Behaviour Ambiguity the path dropped from .533, $se = .052$, $t = 10.231$ to .359, $se = .053$, $t = 6.752$; for Role Evaluation Ambiguity the path dropped from .485, $se = .056$, $t = 8.635$ to .273, $se = .058$, $t = 4.710$; and for Role Consequences Ambiguity the path dropped from .511, $se = .059$, $t = 8.663$ to .351, $se = .062$, $t = 5.619$. When controlling for need satisfaction, the direct effect of ego-involving motivational climate on Role Ambiguity related to Responsibilities increased from .015, $se = .054$, $t = .280$ to .074, $se = .052$, $t = 1.419$. The same pattern for the direct effect of ego-involving motivational climate was monitored for all types of

role ambiguity: for Role Behaviour Ambiguity the path increased from .016, $se=.050$, $t=.319$ to .070, $se=.048$, $t=1.449$; for Role Evaluation Ambiguity the path increased from -.074, $se=.056$, $t=1.324$ to .140, $se=.054$, $t=2.603$; and for Role Consequences Ambiguity the path increased from .141, $se=.058$, $t=2.405$ to .190, $se=.058$, $t=3.306$. Table 26 shows the total, direct, and indirect paths obtained from the mediational model.

Table 26: Total, Direct. and Indirect effects of Motivational Climate on Role Ambiguity

| | | Total effects of Task-involving climate | Direct effects of Task-involving climate | Indirect effects of Task-involving climate | Total effects of Ego-involving climate | Direct effects of Ego-involving climate | Indirect effects of Ego-involving climate |
|----------------------------------|----|--|---|---|---|--|--|
| Role Ambiguity to Responsibility | | .578 | .389 | .189 | .015 | .074 | -.059 |
| | se | .056 | .057 | .030 | .054 | .052 | .021 |
| | t | 10.243* | 6.776* | 6.385* | .280 | 1.419 | -2.814* |
| Role Behaviour Ambiguity | | .533 | .359 | .174 | .016 | .070 | -.054 |
| | se | .052 | .053 | .027 | .050 | .048 | .019 |
| | t | 10.231* | 6.752* | 6.361* | .319 | 1.449 | -2.811* |
| Role Evaluation Ambiguity | | .485 | .273 | .212 | -.074 | .140 | -.066 |
| | se | .056 | .058 | .032 | .056 | .054 | .023 |
| | t | 8.635* | 4.710* | 6.685* | 1.324 | 2.603* | -2.837* |
| Role Consequences Ambiguity | | .511 | .351 | .161 | .141 | .190 | -.050 |
| | se | .059 | .062 | .030 | .058 | .058 | .019 |
| | t | 8.663* | 5.619* | 5.400* | 2.405* | 3.306* | -2.682 |

Results from the SEM mediational analyses for the coach-athlete relationship, motivational climate, need satisfaction, satisfaction, and performance are presented at Table 27.

Table 27: Results from SEM mediational analyses for Study 3B

| INDEPENDENT VARIABLE | χ^2 | CFI | NNFI | SRMR | RMSEA with 90% CI |
|---------------------------------|---------------------------|-----|------|------|-------------------|
| CART-Q/s (mediational model) | $\chi^2 (359)= 1246.3550$ | .91 | .90 | .05 | .06 (.05, .06) |
| CART-Q/s (mediation controlled) | $\chi^2 (360)= 1446.4790$ | .89 | .88 | .16 | .06 (.06, .07) |
| CART-Q/m (mediational model) | $\chi^2 (359)=1091.3397$ | .93 | .92 | .04 | .05 (.05, .06) |
| CART-Q/m (mediation controlled) | $\chi^2 (360)=1445.0011$ | .90 | .88 | .19 | .06 (.06, .07) |
| PMCSQ-2 (mediational model) | $\chi^2 (798)=1695.1890$ | .93 | .93 | .05 | .04 (.04, .04) |
| PMCSQ-2 (mediation controlled) | $\chi^2 (792)=1806.4855$ | .92 | .92 | .09 | .04 (.04, .04) |

5.3.4 Discussion

Based on the Needs theory (Ryan & Deci, 2001), achievement goal theory (Nicholls, 1989) and the 3+1 Cs conceptualisation of the coach-athlete relationship (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a), the overall purpose of Study 3b was to examine the mediating role of need satisfaction on the prediction of role ambiguity by athletes' perceptions of the social contexts. Specifically, perceptions of the social contexts were examined via athletes' self- and meta-perceptions of the coach-athlete relationship and task- and ego-involving motivational climate. It was hypothesised that a coach-athlete relational context and a task-involving climate that provided the means for the satisfaction of the athletes' needs would promote less role ambiguity and greater role clarity. Similarly an ego-involving motivational context hypothesised to thwart athletes' need satisfaction and promote greater role ambiguity and less role clarity.

Results from this study provided support for the aforementioned hypotheses. With regards to the relationship between social contexts and need satisfaction, it was revealed that athletes who felt close to their coach, committed to their athletic relationship, and felt their interactions with their coach within the training sessions were complementary, experienced greater need satisfaction. Additionally, athletes experienced greater need satisfaction in a task-involving climate, where the main purpose of the training focused on learning, and mastering the tasks, and the coach emphasised cooperation and equality of each athlete's contribution to the team. On the

contrary, athletes experienced that their needs were thwarted in an ego-involving environment where the coach concentrated his/her efforts on the best players in the team and where mistakes were not considered part of learning, but were punished. So far, the results support the findings of the previous study and are consonant with the tenets of AGT and SDT.

Specifically, research on social factors and need satisfaction supports these findings. A recent study by Sarrazin, Vallerand, Guillet, Pelletier, and Cury (2002) revealed that task-involving climates (contrasted with ego-involving climates) promoted need satisfaction and negatively predicted dropout in adolescent handballers. Blanchard and Vallerand (1996) found that the athletes felt more autonomous, competent and related to their team when they perceived that their coach was promoting an autonomy-supportive style. Higher perceptions of autonomy, relatedness and competence have been associated with more self-determined types of motivation (Standage, Duda, & Ntoumanis, 2003). In Standage et al.'s (2003) study, structural equation modelling results showed that when athletes perceived an autonomy-supportive and task-involving climate their needs for autonomy, relatedness and competence were satisfied leading to self-determined motivation. It was also revealed that self-determined motivation yielded adaptive motivational responses.

It seems that in sport contexts that promote learning, mastery, effort and improvement, athletes tend to satisfy their need for competence and autonomy, as the criteria for success and evaluation of their competence lie on their effort and mastery, thus there are within their control. Exertion of more effort equals greater competence. In addition, a sport context that promotes greater closeness between the athlete and the coach is more likely to enhance athletes' need for autonomy and competence. In a situation, where the athlete and the coach hold mutual feelings of trust and respect, it is more likely that the athlete will feel free to contribute to the shared goals of the training, the decision making process, and the coach is more likely that he/she will take into consideration the athlete's point of view. Moreover, an athletic context in which complementarity between the coach and the athlete is high, namely, when both the coach's and athlete's behaviours are highly co-operative during training sessions, and both engage in friendly and complementary attitudes, it is more likely that the athlete will satisfy his/her need to relate. A cooperative and complementary coach-athlete relationship implies that both the coach and the athlete have put effort to work well in

training and care about each other. High levels of commitment between the coach and the athlete are more likely to satisfy athlete's needs as well. Especially, when athletes perceive that their coaches make sacrifices and are responsive to their efforts thus showing high levels of commitment towards their athletic relationship, athletes might feel that the coach cares about them and they satisfy their need for relatedness. At this point, it should be repeated that the satisfaction of athlete's needs explored in the present study, referred to the specific needs in the relational context with the coach. Thus the social context in the sport that relates and entails the coach and the athlete is highly relevant to athlete's need satisfaction. With regards, to the relationship between need satisfaction and role ambiguity, results showed that need satisfaction positively predicted all four types of role ambiguity. The amount of variance explained in the four types of role ambiguity ranged from 15% to 28%. The need satisfaction explained more variance in the role ambiguity-scope of responsibilities and role behaviour ambiguity than in the role evaluation ambiguity and much less in role consequences ambiguity. These results are consistent with previous studies that showed ambiguity related to scope of responsibilities to be the major contributor to correlations with other variables (Beauchamp et al., 2003; Beauchamp et al., 2002; Eys et al., 2003). Eys et al. (2003) raised a concern about the multidimensionality of role ambiguity stating that "role ambiguity is not multidimensional in nature", and that role ambiguity associated with "scope of responsibilities reflects an overall representation of role ambiguity similar to the unidimensional approaches taken by early researchers" (p. 299). They suggested that role ambiguity could be conceptualised in a hierarchical fashion, with ambiguity related to scope of responsibilities subsuming the other three types of role ambiguity. Although, in the present study, need satisfaction accounted for more variance in ambiguity associated to scope of responsibilities and ambiguity related to behaviours necessary for athletes to perform their roles, substantial variance in the other two types of role ambiguity was accounted for by need satisfaction. Thus the present results provide further evidence for the multidimensionality of the construct of role ambiguity.

Overall, findings from this study point to the conclusion that athletes were more clear about their roles pertaining to the scope of responsibilities, the behaviours necessary to execute their roles, how their roles would be evaluated, and the consequences of failing to execute these roles effectively, when they perceived greater satisfaction of

their needs in a task-involving motivational climate and an effective coach-athlete relationship context.

The present results on the importance of the social context's influence on athletes' perceptions of role ambiguity through need satisfaction are in line with Beauchamp et al.'s (2005) study. In their study, it was shown that training and instruction provided by the coach was a significant predictor of role evaluation ambiguity in an offensive context and role consequences ambiguity in the offensive and defensive context. Although the present study concentrated on the four types of role ambiguity in general regardless of the offensive and defensive contexts, and although the impact of the social factors on role ambiguity was indirect, certain similarities can be drawn between the two studies. Training and instruction refers to the behaviours exhibited by the coach during practice. The complementarity dimension of the coach-athlete relationship and the dimensions of the motivational climate they all refer to the behavioural aspect of the environment. Thus, as Beauchamp et al. (2005) argued athletes are more likely to attribute role ambiguity to the situational factors involving the coach and the athlete-coach interactions especially, when their needs for autonomy, competence and relatedness have not been met. Athletes who perceive a more task-involving motivational climate and a more effective coach-athlete relationship are more likely to perceive their roles in a team in a clear and unambiguous way. What the present study added to the literature was another indication on how need satisfaction may lead to clear and unambiguous roles. In a task-involving motivational climate emphasis is placed on learning, co-operation and fairness hence a coach is more likely to convey accurately the roles and expectations to his/her athletes and in turn the athletes are more likely to be motivated to understand what their roles are. In such contexts where the objectives promoted by the coaches, are the demonstration of self-referenced ability and the mastering of the skills, it is more likely that the coaches will try harder to clarify the conveyed information to their athletes and will more probably feel willing to insist on clarity of roles. Athletes operating in such environments are likely to feel closer, related and connected to their coach, and more competent, as well as freer to express themselves and their opinions. Thus, in case athletes feel ambiguous about a role or responsibility it is more likely that they will feel more free to ask help from the coach in clarifying it. Similarly, in an effective coach-athlete relationship emphasis is placed on developing trust, respect,

commitment and co-operation hence a coach and an athlete are more likely to engage in open channels of communication from which roles and expectations are clearly conveyed.

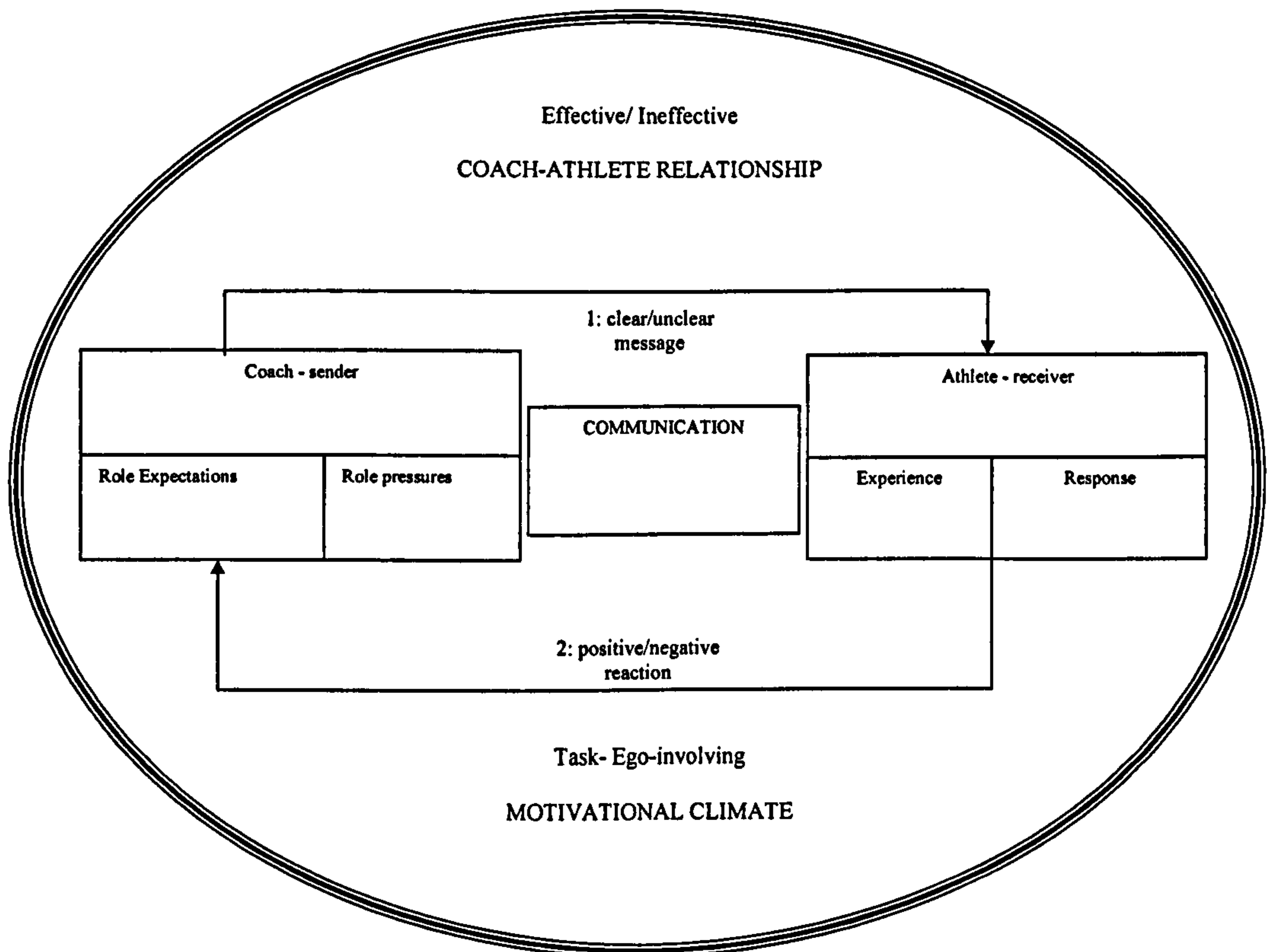
Lastly, in an ego-involving climate, in which coaches recognise only the best athletes and pay less attention to the rest of the players, the majority of the athletes will feel emotional distance from their coach, feel as not very competent athletes due to their coaches' behaviour and attitude, and finally they will not feel that they can express themselves and be who they are. In such an environment, it is expected that athletes will experience more role ambiguity, as they will not feel the freedom to turn to their coaches for help. Similarly in an ineffective coach-athlete relationship the channels of communication between the coach and the athlete will be less conducive to the athlete's attempt to understand roles and responsibilities. Athletes themselves will be less willing to try to resolve ambiguous and unclear roles. These results are supported by Beauchamp et al.'s (2005) findings, namely that for starters in teams' role ambiguity was not related at all with coach's behaviours. The authors suggested that starters have more opportunities in the training sessions to practice their roles and responsibilities than non-starters, thus their roles and responsibilities become clearer. This finding is similar to the social situation created by the coach when all of the coaches' attention falls on the starters, because it is most possible that they will produce winning results for the team.

This study has focused exclusively on the mediating role of the needs according to the mini theory of basic needs (Ryan & Deci, 2000). This finding has important implications for future interventions, as the climate as social factor is more promising and amenable to manipulation than dispositional factors. Coaches through education programs could be informed on the significance of the relationship that they establish on their athletes' need satisfaction to promote greater clarity in understanding the roles that they should perform. Satisfaction of the basic psychological needs and role clarity are more likely to lead to athletes' well being which is the end result, the aim and the end product within all psychosocial contexts (Deci & Ryan, 2000).

Based on the role episode model (Khan et al., 1964) future studies could sought to examine instead of the mediating role of needs, the mediating role of communication in the relationship between the social environment that promotes effective versus ineffective coach-athlete relationships, and task- versus ego-involving climates and

the promotion of role ambiguity/clarity. According to the role episode model, the role sender (e.g., the coach) holds certain expectations in terms of how he/she thinks the focal person/role receiver (e.g., the athlete) should behave and perform. The role sender will convey information about these expectations to the role receiver through role pressures. The athletes' affective, cognitive, and behavioural responses to this process will depend upon how they receive and experience these role pressures. The athletes' responses will in turn impact the coach's role expectations, highlighting the cyclical fashion of the communication process. Therefore, a breakdown in communication and the quality of communication will determine athletes' ambiguity and clarity of their coach's expectations. It would be very interesting to examine the impact of the communication process on role ambiguity in effective coach-athlete relationship and task-involving contexts, and in what way this communication process is facilitated compared to ineffective coach-athlete relationship and ego-involving contexts (see Figure 34). It is hypothesised that in the former contexts, coaches and athletes will be more motivated to work on their communication and improve it than in the latter contexts. Thus the communication will be clear and athletes' responses will be positive and adaptive.

Figure 34: Proposed communication model based on Khan et al. (1964) Role Episode model.



Furthermore, future studies should incorporate the behavioural context in which athletes operate and have role related responsibilities, namely offence and defence. Past research has shown that role ambiguity is more prominent and relevant in offensive contexts compared to defensive contexts due to the coach spending more time on coaching offensive components of play compared to defensive (Beauchamp et al., 2003). Eys and Carron (2001) also suggested that since the offence could be perceived to demand more responsibilities and decisions than defence, thus providing more opportunities for role ambiguity.

It would be also interesting to investigate not only formal roles but informal roles that athletes play in their team context. Informal roles might include team clown, social facilitator, or motivator (Carron & Hausenblas, 1998; Mabry & Barnes, 1980). Although the formal roles are dictated by the coach, the informal ones are formulated by the social interactions within the team. It would be very interesting to investigate which roles and how are they facilitated and promoted by the coach-athlete relationship context.

5.4 Study 3C: Social factors, Satisfaction with the Coach and Subjective Performance. The Mediating Role of Needs.

5.4.1 Introduction

In the sport arena, athletes, coaches, biomechanists, sport nutritionists, physiotherapists, sport psychologists, and many more sport scientists are concerned with the enhancement of athlete's performance. Performance is the end result of a combined effort of mainly the coach and the athlete. Hardy and Jones (1994) stated that one of the two main interpersonal relationships that have the potential to affect performance is the one between the coach and the athlete, with the second one being the relationship among the members of a team.

Additionally, researchers in sport psychology have welcomed and explored the concept of athlete satisfaction. The humanistic significance of this concept is evident with regards to its association with mental health, and its possible links with the quality and quantity of athletes' performance (Whittall & Orlick, 1979). Satisfaction has even been viewed by scholars aspiring to the hedonic approach to well-being, as an indicator of subjective well-being (Ryan & Deci, 2001). In addition, Jowett and Clark-Carter (in press) stated that satisfaction is an important variable, and more specifically satisfaction with performance because this is where both the athlete and the coach ultimately concentrate their efforts. Nevertheless, few studies in the sport domain have investigated the underlying conditions of satisfaction that undermine/facilitate its manifestation (Riemer & Chelladurai, 1998).

The two concepts of satisfaction and performance have been approached by different frameworks and theories, to determine which factors promote or hinder their manifestation. Among these frameworks, the two concepts have been conceptualised and measured differently. Three frameworks/conceptualisations will be put forward in the present study, namely those that have dealt with social factors affecting satisfaction and performance: leadership theories (Chelladurai, 1990), achievement goal theory (Nicholls, 1989), and the 3+1 Cs conceptualisation (Jowett, 2005).

Within the leadership approach, athlete's satisfaction has been recently conceptualised as a multidimensional construct and has been defined as "a positive affective state resulting from a complex evaluation of the structures, processes, and outcomes associated with the athletic experience" (Chelladurai & Riemer, 1997, p. 135). Riemer and Chelladurai (1998) argued that satisfaction and performance should be naturally linked. Athletes who experience higher levels of satisfaction are more likely to exert greater effort when performing and consequently enhance their performance levels. Chelladurai and Carron (1978) stated that "Insofar as the subordinates (athletes) are oriented toward task accomplishment and insofar as the leader (coach) meets the preferences, *both* satisfaction and performance are enhanced. That is, both are direct results of leader behaviour" (p. 71). Riemer and Chelladurai (1998) proposed a number of reasons why it is important to include the concept of satisfaction in psychological research. Bearing in mind the voluntary nature of sport participation, satisfaction is deemed as a prerequisite for the continuation of the athletes' involvement and performance. From an organisational effectiveness point of view, sport contexts as athletic organisations should look after the welfare of the athletes and as athletes "produce" satisfaction and performance, the aim of these organisations is to provide the necessary conditions under which athletes meet their needs. Ultimately, by caring for the athlete, the athlete will be more likely to produce better performance. As in organisational psychology job satisfaction is given top priority and constitutes the prime aim of the organisations so that employees' productivity is high, similarly, in sports organisations athletes' satisfaction should be given a pre-eminent status (Riemer & Chelladurai, 1998).

Satisfaction as an outcome in the multidimensional model of leadership (Chelladurai, 1990), has been extensively investigated. The majority of the studies measured satisfaction with scales comprising a single item (Horn & Carron, 1985; Riemer & Chelladurai, 1995) or multiple single items measuring multiple dimensions of satisfaction (Chelladurai, 1984; Schliesman, 1987). Recently, Riemer and Chelladurai (1998) developed the Athlete Satisfaction Questionnaire that measures fifteen different aspects of satisfaction: individual performance (3 items), team performance (3 items), ability utilisation (5 items), strategy (6 items), personal treatment (5 items), training and instruction (3 items), team task contribution (3 items), team social contribution, ethics (3 items), team integration (4 items), personal dedication (4 items),

budget (3 items), academic support services (3 items), medical personnel (3 items), and external agents (4 items). The multidimensional conceptualisation of the satisfaction was based on three classification criteria: a) outcomes versus processes, b) personal versus team effects, and c) task versus social aspects. The ASQ exhibited good factor structure (e.g., Tucker-Lewis Index=.93, CFI=.94, RMSEA=.04 with 90%CI= .04-.04), reliability (α ranged from .78 to .95), and good criterion validity in a sample of Canadian university athletes (Riemer & Chelladurai, 1998). The format of the scale allows researchers to include those dimensions of satisfaction most salient to their research hypothesis and particular situation (Riemer & Toon, 2001). Satisfaction as a multidimensional construct has been examined within the leadership framework in relation to athletes' preferences and perceptions of coach's behaviour (e.g., Chelladurai, 1984; Chelladurai et al., 1988; Dwyer & Fischer, 1990). Overall results from various studies has shown that discrepancy between perceived and preferred coach behaviours of training and instruction and positive feedback (Chelladurai, 1984) social support (Horn & Carron, 1985; Riemer & Chelladurai, 1995; Schliesman, 1987) explained greater percentage of the variance in athletes' perceived satisfaction levels than did either of the two sets of perceptions alone. On the other hand, perceived coaching behaviours explained a greater amount of variance in athletes' satisfaction (Chelladurai, Imamura, Yamaguchi, Oinuma, & Miyauchi, 1988; Riemer & Toon, 2001) than did the congruence of perceived and preferred coach behaviours.

Regarding the study of athletes' performance as an outcome of perceptions, preferences and actual coaching behaviours, Chelladurai (1993) argued that its operationalisation and measurement was not adequate. Performance had been assessed in terms of win/loss percentage (Weis & Friedrichs, 1986), amount of playing time (Garland & Barry, 1988), and individualised perceived performance (Chelladurai, Imamura, Yamaguchi, Oinuma, & Miyauchi, 1988). In order to overcome this deficiency Courneya and Chelladurai (1991) classified performance measures in baseball in primary, secondary, and tertiary measures based on their conceptual proximity to skill execution and task performance. Elsewhere, performance has been operationalised and measured in terms of athletes' perceptions of actual performance, performance improvements, and attainment of previously set goals (Chelladurai, 1984; Horn & Carron, 1985). Although few studies have attempted to measure performance,

cumulative results from all the studies following the tenets of the Multidimensional Model of Leadership have provided partial support for Chelladurai's model.

To summarise, in the Multidimensional Model of Leadership (Chelladurai, 1990) member satisfaction and team performance were theorised to be a positive function of the degree of congruence between three aspects of coach's behaviour: the coach's actual behaviour, the coach's behaviour that is preferred by the team and the perceived coach's behaviour. A feedback loop suggests that satisfaction and performance are likely to influence the actual coach's behaviour, although no published study has investigated the postulation of the feedback loop yet. Although the construct of satisfaction has been adequately conceptualised and operationalised recently, the construct of performance raises certain issues. Chelladurai & Riemer (1998) comment that when performance is measured in terms of athletes' perceptions, athletes' affective reactions in terms of satisfaction are expected to contaminate athletes' perceptions as the two constructs are too closely linked. They recommended that performance should be better assessed in terms of measures generated by third parties. This suggestion though, bears certain difficulties, with the first one lying in the presence of the third party that is not always feasible, especially for evaluating each athlete individually. Another difficulty lies at the objective evaluative criteria that should be employed in the assessment of the performance.

Satisfaction and performance have been included in other theoretical frameworks, such as the achievement goal theory framework (Ames, 1992; Duda, 1989; Nicholls, 1989). A distinction between individual and team satisfaction and objective and subjective performance at an individual and team level has been suggested (Duda & Balaguer, 1999). An extension of Chelladurai's (1990) leadership framework made by achievement goal theorists, regarding social factors proposed to influence athletes' satisfaction and performance included both, coaching behaviours and the motivational climate (Duda & Balaguer, 1999). Empirical research employed different approaches in the study of satisfaction and performance.

Performance in most of the cases in achievement goal literature has been studied subjectively, in terms of satisfaction with individual and team level performance (Balaguer et al., 2002; Balaguer et al., 1999). In these studies, the focus of measuring performance was on how the athletes perceived their subjective improvement in the game. Subjective improvement was considered multidimensionally in terms of the

context, that is, team and individual level, and in terms of the aspects entailed in it, that is technical, tactical, physical, and psychological aspects of the game.

The concept of satisfaction has been used as a multidimensional and a unidimensional construct in the achievement goal literature, but distinctive in terms of individual and team context. For example, single items were used to measure satisfaction with individual and team level of play (Balaguer et al., 2002) and satisfaction with competitive results, level of play and individualised instruction provided by the coach (Balaguer et al., 1999).

On the other hand, in Treasure and Roberts' (2001) study five items were used to assess athletes' satisfaction with participation in soccer. Satisfaction was conceptualised as a unidimensional construct indicating more intrinsic interest and enjoyment (e.g., "I enjoyed playing soccer", "I got really involved playing soccer"). In another study the authors examined the sources of satisfaction in terms of different areas consistent with achievement goal theory tenets (Treasure & Roberts, 1998). Athletes answered to a stem "During camp how much satisfaction did you feel when you..." for 11 items measuring mastery experiences (e.g., "Learned new skills", "Found playing challenging"), social approval (e.g., "Pleased the coach", "Please my friends"), and normative success (e.g., "Did better than others", "Won games"). Satisfaction with being a member of the team was measured in Walling, Duda, and Chi's (1993) study, using three items developed by the authors. Treasure and Roberts' (1998) study conceptualised satisfaction as a multidimensional concept and as such bears certain similarities with the conceptualisation within the ASQ. Both questionnaires include aspects related to the coach and normative success. The ASQ though encompasses a more "exhaustive set of facets of satisfaction that reflects the various aspects of athletic experience" (Riemer & Chelladurai, 1998, p. 131). The ASQ has been used though more extensively as a measurement instrument in the leadership research, whereas Treasure and Roberts' instrument was developed specifically for their study.

Overall findings from achievement goal studies, measuring the impact of athletes' perceptions of the motivational climate on athletes' satisfaction and performance have produced the following results: a) perceptions of a task-involving climate positively predict athletes' satisfaction and performance, and b) perceptions of an ego-involving climate negatively predict athletes' satisfaction and performance.

In the coach-athlete relationship literature, and more specifically within the 3+1 Cs conceptualisation (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a) several attempts have been conducted to study athletes' satisfaction, using both unidimensional and multidimensional conceptualisations of satisfaction. Jowett and Ntoumanis (2004) hypothesised that the coach-athlete relationship as a social context will influence athletes' satisfaction. Athletes' satisfaction with the overall coach-athlete relationship was measured with two single items in a unidimensional fashion (Jowett, 2001; Jowett & Ntoumanis, 2003, 2004). A multifaceted approach to the study of the athlete's satisfaction within the coach-athlete relationship was adopted by Jowett and colleagues (Jowett & Clark-Carter, in press; Jowett & Don Carolis, 2003). Jowett and Don Carolis (2003) studied self-perceptions of the coach-athlete relationship in relation to satisfaction with individual performance, training and instruction, personal treatment, and personal dedication. Data were analysed separately for male and female athletes. Results showed that closeness did not contribute in the prediction of male and female athletes' satisfaction. A significant finding generated from this study was the prediction of satisfaction with individual performance by female athletes' complementarity. Consistent with Jowett and Ntoumanis' (2003) findings, closeness did not emerge as a significant predictor of athletes' satisfaction in this study.

Accordingly, Jowett and Clark-Carter (in press) used Riemer and Chelladurai's (1998) questionnaire and a modified version of it to measure self- and meta-perceptions of satisfaction along with meta-perceptions of the coach-athlete relationship with a sample of Greek athletes. Specifically, Jowett and Clark-Carter used self- and meta-perceptions of the satisfaction pertaining to personal training, individual performance and external agents. Results indicated that athletes' self- and meta-satisfaction with their performance was positively predicted by accuracy in coach and athletes' perceptions of commitment. Athletes' self- and meta-perceptions of closeness, commitment and complementarity positively predicted self- and meta-satisfaction. Results from this study extended the information gained by Jowett and Don Carolis' (2003) study, in that athletes' self- and meta-perceptions predicted self- and meta-satisfaction explaining a substantial amount of variance (ranging from 47% to 61% for the self-satisfaction and 34% to 63% in meta-satisfaction). Furthermore, performance

variables have not been investigated within the 3+1 Cs conceptualisation of the coach-athlete relationship.

Based on the studies conducted following the tenets of these three theoretical frameworks/conceptualisations (i.e., leadership approach, achievement goal theory, and the 3+1 s conceptualisation) that have investigated the impact of social factors on athletes' satisfaction and performance, it was shown that results confirmed the theoretical assumptions. When athletes perceived that their coaches provided more training and instruction, social support, positive feedback (e.g., Chelladurai, 1984; Horn & Carron, 1985), democratic behaviour (e.g., Schliesman, 1987), and created a task-involving climate (e.g., Balaguer, et al., 2002; Balaguer et al., 1999), and perceived high levels of closeness, commitment and complementarity as well as coach's accuracy to infer athletes' perceptions of the coach-athlete relationship (e.g., Jowett & Clark-Carter, in press) have all been found to positively associate and predict athletes' satisfaction. Similarly, when athletes perceived their coach to exhibit more autocratic behaviour (e.g., Dwyer & Fischer, 1990), create an ego-involving climate (e.g., Treasure & Roberts, 1998) and when athletes perceived lower levels on the 3 Cs (e.g., Jowett & Clark-Carter, in press) athletes' satisfaction was lower. With regards to athletes' performance, results from studies showed that when athletes perceived their coach to exhibit higher levels of rewarding and social supportive behaviours they perceived lower performance (Weiss & Friedrichs, 1986); when athletes perceived their coach to exhibit higher levels of training and instruction their performance was higher (Summers, 1983); when athletes perceived that their coach reinforced a more ego-involving climate their performance was lower (Balaguer et al., 2002; Balaguer et al., 1999).

Results also suggested that the ASQ is a reliable instrument and covers a wide range of areas with athletes' satisfaction. Furthermore, performance because of its difficulty to measure has not been widely used as an outcome variable in the sport psychology literature, and there is no consensus among the researchers as to how it should be measured. As Weinberg (1990) stated a focus solely on outcome variables of performance, such as wins/loses, may mask the quality of the performance, and so does not necessarily reflect how well an individual or team have performed. For example, an athlete can perform his/her personal best but can still lose the game or the race. Riemer and Chelladurai (1998) articulated some considerations too, about the

measurement of objective performance in terms of win/loss percentages. It seems that after wins or loses, performance is biased due to luck, unpredicted circumstances, opponents' extraordinary performance, wrong call by the officials, and generally factors that are not always under the control of the athlete. Thus, win/loss percentages do not always reflect the relative performance of the athletes. Instead, subjective measurements and indicators of performance have been utilised. Many researchers expressed the need for more reliable and valid measurements of performance (Gould & Krane, 1992; Hardy & Jones, 1994; Jones, 1995). Hughes and Bartlett (2002) argued that a valid measurement of performance should include match, tactical, technical and biomechanical indicators.

Rees, Ingledew, and Hardy (1999) and Rees, Hardy, and Ingledew (2000) took a very different approach in the study of performance and concentrated on the process rather than the outcome of the performance. Thus, instead of focusing on win/loss percentages that represent the quantitatively performance, chose to focus on the qualitative aspects of it. They stated that performance assessment should include several factors tapping different psychological dimensions of performance. In Rees et al.'s (1999) pilot study with tennis players, principal component analysis revealed eight factors: execution of flexible plan, loss of composure, feeling flat, positive tension, worry, flow effective tactics, and double faults. Rees et al. (2000) refined the instrument eliminating the double faults scale, resulting in a 35-item instrument loading on seven factors. Results from confirmatory factor analysis revealed that the seven factor model exhibited good fit to the data (CFI= .92, SRMSR= .07, and RMSEA= .05).

Thus far, in the motivational climate and the coach-athlete relationship literature, very few studies have examined the impact of the social environment on performance and satisfaction simultaneously (Balaguer et al., 2000; Balaguer et al., 1999). Based on Chelladurai and Riemer's (1998) suggestions that the study of performance should be better accompanied with the study of athletes' satisfaction as "it becomes problematic to empirically separate the two measures (p. 244) because satisfaction is so closely linked to performance. Unlike though Chelladurai and Riemer's recommendations to collapse the two constructs in one measurement instrument, that is to study satisfaction with performance, it is suggested at this study, that satisfaction and performance constitute two separate constructs. Satisfaction with performance could

and should constitute one of the facets of athlete's performance, but athletes' perceptions of their performance entail different aspects, as well as a cognitive evaluation of technical and tactical aspects of their game. No published research to my knowledge though, has studied the mechanisms through which such an impact is taking place. Riemer and Chelladurai (1998) suggested that athletes' satisfaction "could be a function of the need satisfaction" (p. 131). Although the authors did not specify the types of needs, it is suggested that the three psychological needs for autonomy, competence, and relatedness will serve as antecedents of athletes' satisfaction. Deci and Ryan (2000) stated that need fulfilment is viewed as a natural aim of human life that delineates many of the meanings and purposes underlying human actions. Therefore the focal point of the present study centres around the satisfaction of the three psychological needs as the mechanism through which motivational climates and coach-athlete relationship influence several dimensions of subjective performance and satisfaction. Specifically, the following hypotheses were formulated and tested:

- a) Athletes who perceive a more effective coach-athlete relationship (higher levels of the 3 Cs) and higher levels of need satisfaction (higher levels of autonomy, competence and relatedness) are expected to perceive higher levels in their satisfaction and performance. Similarly, athletes who perceive a less effective coach-athlete relationship (lower levels of the 3 Cs) and lower levels of need satisfaction (lower levels of autonomy, competence and relatedness) are expected to perceive lower levels in their satisfaction and performance.
- b) Athletes who perceive a more task-involving motivational climate and higher levels of need satisfaction (higher levels of autonomy, competence and relatedness) are expected to perceive higher levels in their satisfaction and performance.
- c) Athletes who perceive a more ego-involving motivational climate and lower levels of need satisfaction (lower levels of autonomy, competence and relatedness) are expected to perceive lower levels in their satisfaction and performance.

5.4.2 Methodology

5.4.2.1 Participants

Participants were 936 university athletes (559 males and 377 females) participating in team sports. Their age ranged from 17 to 48 years old ($M=21.23$, $SD=2.41$). Participants performed in a variety of university team sports: rugby ($N=125$, 13.4%), football ($N=122$, 13%), hockey ($N=22$, 2.4%), volleyball ($N=81$, 8.7%), basketball ($N=119$, 12.7%), rowing ($N=320$, 34.2%), ultimate Frisbee ($N=20$, 2.1%), American football ($N=17$, 1.8%), netball ($N=41$, 4.4%), korfbal ($N=19$, 2%), water polo ($N=34$, 3.6%), lacrosse ($N=8$, .9%), canoe polo ($N=8$, .9%). Their playing experience with their particular sport ranged from 1 month to 22 years ($M=5.90$, $SD=4.90$). The time that the athletes had spent with their coach in training sessions ranged from 1 month to 10 years ($M=.83$, $SD=1.05$). The athletes have been with their team from 1 month to 10 years ($M=1.20$, $SD=1.37$). Participants were practicing from 1 to 39 hours per week ($M=7.60$, $SD=5.85$).

5.4.2.2 Procedures

The same procedures were used as in studies 3a and 3b. Questionnaires were administered after sought for coaches' consent, in the teams' training grounds before the commencement of a practice.

5.4.2.3 Instrumentation

Coach-Athlete Relationship. Coach-Athlete Relationship Questionnaire/self-perceptions (CART-Q self-perceptions: Jowett & Ntoumanis, 2004) was used to measure the relationship between the coach and the athlete as perceived by the athletes. The 11-item CART-Q self-perception version comprises Closeness, Commitment and Complementarity dimensions. For this sample internal consistency scores of the CART-Q meta-perception version subscales were .89 for closeness, .82 for commitment, and .86 for complementarity while the reliability for the overall CART-Q self perception version scale was .94.

The 11-item CART-Q/meta-perception version (CART-Q meta-perceptions: Jowett, 2002) measures closeness, commitment and complementarity as perceived by the athlete referring to coach's perspective. For this sample internal consistency scores of the CART-Q/meta-perception version subscales were .89 for closeness, .81 for

commitment, and .88 for complementarity while the reliability for the overall CART-Q/meta-perception version scale was .95. For a more detailed description refer to Chapter II, Literature Review, pp. 78-79.

Motivational Climate. Motivational Climate in Sports Questionnaire-2 was utilised to assess athletes' perception of the coach-created motivational climate in their team. (PMCSQ-2: Newton, Duda, & Yin, 2000). Task- and ego- involving climate constitute the two higher order dimensions of the questionnaire. Task involving climate comprises three subdimensions: 'cooperative learning', 'effort/improvement', and 'important role'. The ego-involving climate scale contains three dimensions: 'intra-team member rivalry', 'unequal recognition', and 'punishment for mistakes'. Intra-team rivalry subscale was excluded from further research and analysis because of the consistently reported low reliability scores at Study 1 of the present thesis, and previous studies (e.g., Gano-Overway & Ewing, 2004; Halliburton & Weiss, 2002; Newton et al. 2000; Treasure & Roberts, 1998). For the present study the Cronbach alpha coefficients were for the subscale of effort/ improvement .76, for the subscale of important role .77, for co-operative learning .79, for punishment for mistakes .80, and for unequal recognition .88. Reliabilities for the higher order dimensions were .90 for task-involving climate and .88 for the ego-involving climate. For a detailed description of the PMCSQ-2 refer to Chapter II, Literature Review, pp. 33-37.

Need Satisfaction: A 6-item modified version of the Need Satisfaction Scale (NSS; La Guardia, Ryan, Couchman, & Deci, 2000) was used to assess athletes' perceptions of the coach's contribution to the satisfaction of their basic needs. In this study, the scale was adapted to measure how participants met these needs specifically in terms of their relationship with their coach. The basic needs reflect: (a) the need for autonomy, (b) the need for relatedness and (c) the need for competence. It is a self-reported consisting of 3 subscales with a 7-point Likert scale from *strongly disagree* (1) to *strongly agree* (7). A modification of the basic stem was introduced before each item "When I am with my coach ...". The reliability of the need satisfaction scale was .84. For a detailed description of the NNS refer to Chapter X, Study1 , pp. 221-222.

Performance assessment. Performance was assessed in the present study using a modified for team sports version of the Rees, Hardy and Ingledew's (2000) performance assessment instrument. It is a subjective measure of perceived performance, which is process- rather than outcome-oriented as reported by the

athletes themselves and reflects athletes' general perceptions of several factors underlying performance. The focus of this study was to assess behavioural components as well as positive affective elements of the perceived performance. Certain subscales from the Rees, Hardy and Ingledew's (2000) instrument were specific for individual sports and specific for racquet sports involving the use of a ball. Participants in this study were athletes from team sports, from which some did not use a ball. Therefore, modifications in the items of the subscales were necessary in order to adequately measure subjective team sport performance. The 12-item instrument used in this study comprised three dimensions of subjective performance, according to Rees, Hardy and Ingledew's (2000) instrument. The dimensions included Execution of (Flexible) Plan (4 items; e.g., "adapt to changing circumstances") reflecting athletes' adoption of a flexible plan of action that could implement it under different circumstances, Flow (4 items; e.g., "keep a consistent standard") reflecting feelings of performing well and general feeling good while playing and Effective Tactics (4 items; e.g., "use effective strategies") representing the adoption of good and effective strategies while playing. The following prefix (stem) preceded each question "During your last few matches to what extent did you....". Athletes rated their consent to each statement on a 7-point response scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). Acceptable internal consistencies (Cronbach's alpha) were reported for the performance subscales: .71 for Execution of (Flexible) Plan, .78 for Flow and .85 for Effective Tactics, while the reliability for the overall performance scale was .91.

Satisfaction. Multifaceted satisfaction was measured by three selected facets of the Athlete Satisfaction Questionnaire (ASQ: Riemer & Chelladurai, 1998). Based on the format of this scale, researchers are allowed to include those dimensions of satisfaction that are most salient for a particular situation and research question. In the present study, three dimensions were considered central to the social context involving the coach and the athlete and were subsequently included: (a) Satisfaction with Individual Performance (3 items e.g., "I am satisfied with the degree of which I have reached my performance goals this season") which refers to the athlete's satisfaction with his/her individual performance on the task, the attainment of his/her goals and personal growth; (b) Satisfaction with Team performance (3 items; e.g., "I am satisfied with the team's win/loss record this season") which refers to the athlete's

satisfaction with his/her team performance levels regarding win/loss record and reaching team goals; (c) Satisfaction with personal treatment (5 items; e.g., “I am satisfied with the recognition I receive from my coach”) referring to the social support provided by the coach as well as feelings of loyalty, friendliness and recognition in the interpersonal relationship with the coach. This dimension of satisfaction refers to those coaching behaviours that directly affect the individual, yet indirectly affect team development. The items are presented on a 7-point response scale anchored by 1 (“not at satisfied”) and 7 (“extremely satisfied”). Thus, high scores reflect greater satisfaction. Reliabilities for the subscales were .93 for Satisfaction with personal treatment, .87 for Satisfaction with Personal Performance and .91 for Satisfaction with team performance.

5.4.3 Results

5.4.3.1 Descriptive Statistics

Table 28 presents the means, standard deviations, the values of skewness, and kurtosis among all the subscales used in this study. An estimation of the means showed that participants had moderate to high perceptions of their relationship with their coach, moderately to low perceptions of an ego-involving whereas a moderate to high task-involving climate operating in their team. Participants were moderately satisfied with the personal treatment they received from their coach, with their personal performance and the team’s performance. They perceived a moderate satisfaction of their needs. Participants reported having a moderate to high execution of a flexible plan, experiencing flow when they were competing and use of effective tactics.

Table 28: Descriptive Statistics of the subscales used in Study 3b

| | Mean | SD | Skewness | Kurtosis |
|--|------|------|----------|----------|
| QART-Q/ self-perceptions | | | | |
| Self-Closeness | 5.13 | 1.17 | -.62 | .42 |
| Self-Commitment | 4.43 | 1.20 | -.44 | .23 |
| Self-Complementarity | 5.03 | 1.09 | -.57 | .51 |
| QART-Q/ meta-perceptions | | | | |
| Meta-Closeness | 4.68 | 1.11 | -.36 | .13 |
| Meta-Commitment | 4.27 | 1.16 | -.31 | .22 |
| Meta-Complementarity | 4.74 | 1.03 | -.29 | .37 |
| ASQ | | | | |
| Satisfaction with personal treatment | 4.83 | 1.14 | -.45 | .28 |
| Satisfaction with individual performance | 4.77 | 1.19 | -.44 | .02 |
| Satisfaction with team performance | 4.78 | 1.31 | -.35 | -.27 |
| NSQ | | | | |
| Need Satisfaction | 4.73 | 1.01 | -.51 | .46 |
| PMCSQ-2 | | | | |
| Cooperative Learning | 3.99 | .587 | -.50 | .63 |
| Effort/ Improvement | 3.95 | .67 | -.65 | .80 |
| Important role | 3.89 | .70 | -.52 | .33 |
| Punishment for mistakes | 2.65 | .88 | .26 | -.37 |
| Unequal recognition | 2.88 | .88 | -.02 | -.56 |
| Performance Questionnaire | | | | |
| Execution of flexible plan | 4.92 | .98 | -.34 | .02 |
| Flow | 5.09 | .98 | -.52 | .37 |
| Effective Tactics | 5.04 | 1.02 | -.48 | .32 |

Note: Response scale for the CART-Q/self- and meta-perceptions ranged from 1 to 7; for the ASQ ranged from 1 to 7; for the NSS ranged from 1 to 7; for the PMCSQ-2 ranged from 1 to 5; and for the Performance Questionnaire ranged from 1 to 7.

5.4.3.2 Bivariate Correlations

Simple bivariate correlations were conducted among all the subscales of the variables included in this study. The subscales of CART-Q self-perceptions had very high correlations among them ranging from .76 to .86. The subscales of CART-Q meta-

perceptions had high correlations among them ranging from .75 to .87. The CART-Q subscales correlated highly with the meta perceptions version subscales as expected, ranging from .66 to .78 and low to ego-involving climate subscales ranging from -.10 to -.37, whereas moderate for the task-involving climate subscales ranging from .36 to .55. Satisfaction with personal treatment reported very high correlations with the CART-Qs subscales ranging from .69 to .75, moderate to high correlations with needs (.65), moderate correlations to performance subscales ranging from .45 to .48, moderate correlations with task climate subscales ranging from .43 to .45 and from -.24 to -.38 with the ego-involving climate subscales. Satisfaction with personal performance and satisfaction with team performance correlated low to moderate with the CART-Q subscales ranging from .32 to .48, low to moderate with need satisfaction ranging from .35 to .42, moderate to high with the performance subscales ranging from .42 to .51, low to moderate with the task-involving climate subscales ranging from .29 to .46 and low with the ego climate subscales ranging from no correlation to -.13. Performance subscales reported low to moderate correlations with all the CART-Qs, satisfaction, needs and task-climate subscales ranging from .17 to .51 with the exception of nonsignificant and very low correlations with ego-climate subscale ranging from no correlation to -.08. Task climate had low to moderate correlations with all subscales ranging from .29 to .55. Ego climate subscales had low and negative correlations with all subscales ranging from .00 to -.38. Need satisfaction had correlations ranging from -.17 to .65. All correlations apart from some of the ego-climate subscales were statistically significant. Table 29 presents the correlations among all the variables in the study.

Table 29: Correlations among all the variables used in study 3c

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|------|
| 1. Self-Closeness | | .78*** | .86*** | .73*** | .67*** | .71*** | .73*** | .47*** | .34*** | .60*** | .52*** | .55*** | .49*** | -.21*** | -.37*** | .44*** | .45*** | .43* |
| 2. Self-Commitment | | | .76*** | .69*** | .74*** | .67*** | .69*** | .46*** | .32*** | .59*** | .42*** | .44*** | .39*** | -.10** | -.27*** | .41*** | .39*** | .39* |
| 3. Self-Complementarity | | | | .74*** | .66*** | .78*** | .72*** | .48*** | .36*** | .61*** | .52*** | .51*** | .45*** | -.20*** | -.34*** | .45*** | .47*** | .44* |
| 4. Meta-Closeness | | | | | .81*** | .87*** | .75*** | .47*** | .36*** | .65*** | .48*** | .45*** | .43*** | -.19*** | -.28*** | .45*** | .47*** | .43* |
| 5. Meta-Commitment | | | | | | .75*** | .70*** | .44*** | .32*** | .64*** | .38*** | .38*** | .36*** | -.10** | -.24*** | .38*** | .38*** | .38* |
| 6. Meta-Complementarity | | | | | | | .72*** | .47*** | .36*** | .63*** | .51*** | .47*** | .43*** | -.17*** | -.24*** | .46*** | .47*** | .44* |
| 7. Satisfaction with personal treatment | | | | | | | | .50*** | .39*** | .65*** | .45*** | .46*** | .43*** | -.24*** | -.38*** | .45*** | .48*** | .45* |
| 8. Satisfaction with Individual performance | | | | | | | | | .49*** | .42*** | .46*** | .45*** | .41*** | -.04 | -.13*** | .51*** | .49*** | .50* |
| 9. Satisfaction with team performance | | | | | | | | | | .35*** | .36*** | .29*** | .30*** | -.00 | -.06 | .42*** | .44*** | .47* |
| 10. Need Satisfaction | | | | | | | | | | | .40*** | .34** | .35*** | -.17*** | -.22*** | .35*** | .39*** | .38* |
| 11. Cooperative Learning | | | | | | | | | | | | .73*** | .66*** | -.08* | -.21*** | .42*** | .40*** | .40* |
| 12. Effort/Improvement | | | | | | | | | | | | | .65*** | -.06 | -.25*** | .41*** | .34*** | .37* |
| 13. Important Role | | | | | | | | | | | | | | -.07* | -.34*** | .36*** | .35*** | .34* |
| 14. Punishment for Mistakes | | | | | | | | | | | | | | | .56*** | -.00 | -.08* | -.03 |
| 15. Unequal Recognition | | | | | | | | | | | | | | | | -.04 | -.07* | -.05 |
| 16. Execution of flexible plan | | | | | | | | | | | | | | | | | .72*** | .81* |
| 17. Flow | | | | | | | | | | | | | | | | | | .78* |
| 18. Effective tactics | | | | | | | | | | | | | | | | | | |

*** Correlation is significant at the 0.001 level (2 tailed).

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

5.4.3.3 Gender Differences

Five MANOVAs were performed to test for gender differences in all the subscales. Two MANOVAs were conducted to test for gender differences in the CART-Q/ self- and meta-perceptions version subscales. MANOVAs were significant Wilk's Lambda=0.98; $F(3, 932) = 7.36$; $p < 0.001$, $\eta^2 = .007$, observed power=.728 for CART-Q self-perceptions version and Wilk's Lambda=0.99; $F(3, 932) = 4.22$; $p < 0.001$, $\eta^2 = .013$, observed power=.859 for the meta-perceptions version. Results showed that females felt closer to their coach (Univariate $F(1, 934) = 6.61$, $p < .01$, $\eta^2 = .007$, observed power=.728) than males. ANOVA showed no significant gender differences in the way athletes perceive the self-commitment and self-complementarity in the coach-athlete relationship. Furthermore, ANOVA showed that female athletes held higher levels of meta-closeness (Univariate $F(1, 934) = 6.60$, $p < .01$, $\eta^2 = .007$, observed power=.728) and meta-complementarity (Univariate $F(1, 934) = 6.77$, $p < .01$, $\eta^2 = .007$, observed power=.739) compared to male athletes.

MANOVA conducted for gender differences with athletes' perceptions of the coach-created motivational climate was significant (Wilk's Lambda=0.90; $F(5, 930) = 19.91$; $p < 0.001$, $\eta^2 = .097$, observed power=1.00). Results indicated that females scored higher in all of the task subscales and lower in all of the ego-involving climate subscales. Specifically, follow up ANOVA showed that female athletes reported higher perceptions of cooperative learning (Univariate $F(1, 934) = 29.73$, $p < .001$, $\eta^2 = .031$, observed power=1.00), effort/improvement (Univariate $F(1, 934) = 19.00$, $p < .001$, $\eta^2 = .020$, observed power=.992) and important role (Univariate $F(1, 934) = 21.68$, $p < .001$, $\eta^2 = .023$, observed power=.996) compared to male athletes. On the other hand male athletes reported higher perceptions of punishment for mistakes (Univariate $F(1, 934) = 71.69$, $p < .001$, $\eta^2 = .071$, observed power=1.00) and unequal recognition (Univariate $F(1, 934) = 34.98$, $p < .001$, $\eta^2 = .036$, observed power=1.00).

One way ANOVA was conducted for gender differences with satisfaction of athletes' basic needs and was non significant $F(1, 934) = 1.31$. MANOVA was conducted for gender differences with the performance subscales and was non significant. Finally, MANOVA was conducted for gender differences with the dimensions of satisfaction and it was non significant.

5.4.3.4 Confirmatory Factor Analysis

CART-Qs. A hierarchical model was specified for the self-perceptions of the coach-athlete relationship and the same model was applied to the meta-perceptions version, where the subscales of closeness, commitment and complementarity were subsumed, as in studies 3a and 3b.

PMCSQ-2. Furthermore, a hierarchical structure for the perceptions of the motivational climate was tested. The two higher order dimensions being task and ego climate. Task involving climate comprises 3 subscales, whereas ego climate comprises two in the present study.

NSS. The Satisfaction of the athlete's needs constituted one factor reflecting the three basic needs of autonomy, relatedness and competence (Deci & Ryan, 2000). Because of the reported poor reliabilities of the three dimensions of needs and because the concept of needs was essential to the study a composite score was calculated reflecting all the different needs.

Performance Questionnaire. A three first-order factor model for the perceived performance questionnaire was tested where the three dimensions of performance, execution of flexible plan, flow and effective tactics were correlated according to Rees, Hardy and Ingledew (2000).

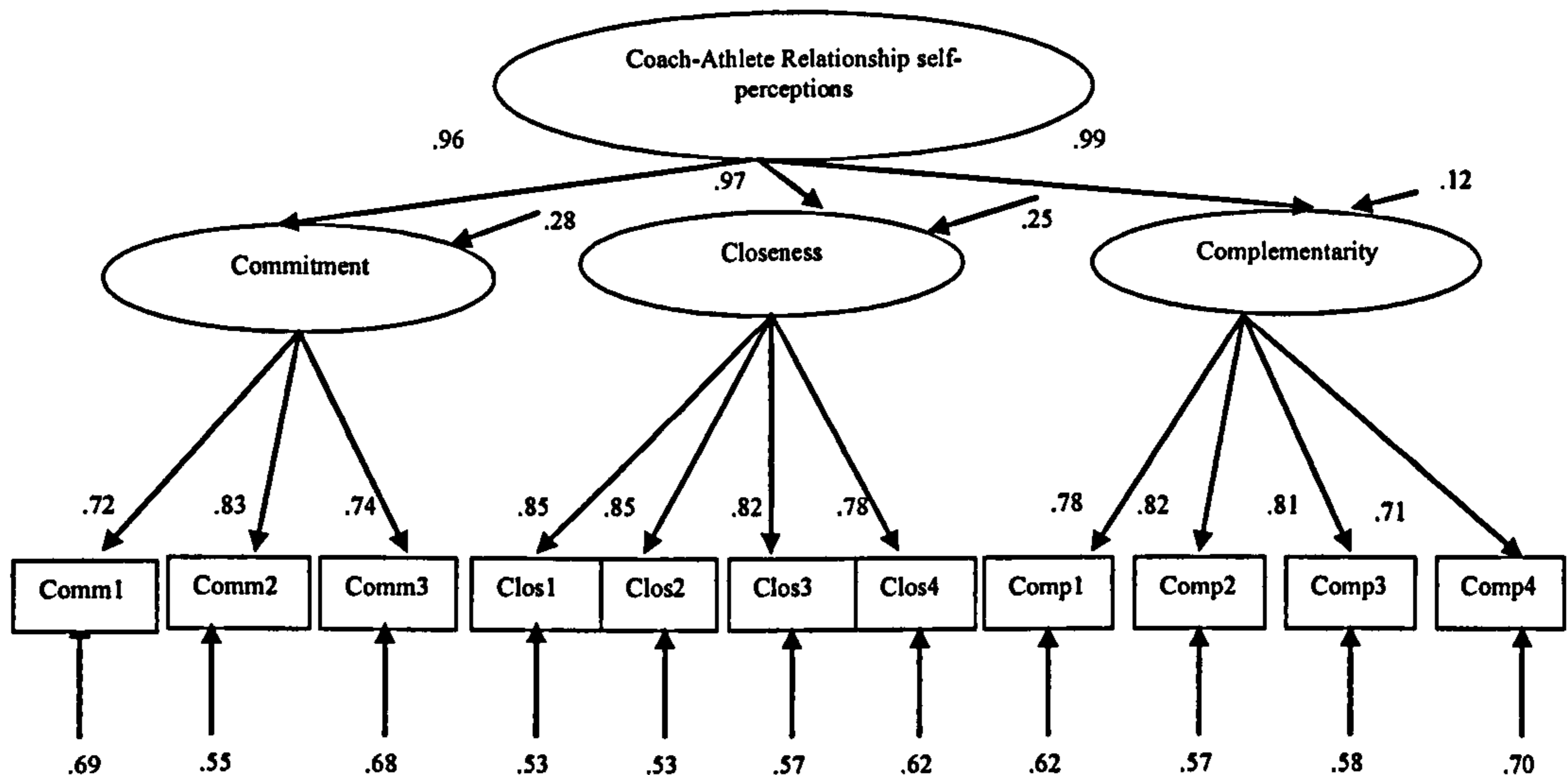
ASQ. Finally, a three first-order factor model for satisfaction was tested. The factors of satisfaction with personal treatment, satisfaction with individual performance and satisfaction with team performance were correlated (Riemer & Chelladurai, 1998).

Model estimation. Data on all the models were assessed via Confirmatory Factor Analysis (CFA) conducted with EQS6.1 (Bentler, 2005) using Maximum Likelihood estimation procedures and in some cases Maximum Likelihood robust where data were highly skewed indicating non-normality.

Model Assessment. Multiple fit indexes were used as in studies 3a and 3b, in order to evaluate goodness of fit of the models tested in this study: (a) chi square statistic (χ^2), as well as the rescaled χ^2 (Sattora & Bentler, 1988) (b) the nonnormed fit index (Bentler & Bonett, 1980) (c) the comparative fit index (CFI; Bentler, 1990) (d) the standardised root mean square residual (SRMR) and the (e) RMSEA (Steiger, 1990).

(a). For the CART-Q/ self-perceptions version confirmatory factor analysis results showed that the second-order factor model fit the data marginally [$\chi^2(42)=687.170$, $p<0.01$; NNFI= .89; CFI= .92; SRMR= .04; RMSEA= .13]. Mardia's coefficient was high (63.47) indicating multivariate non-normality, thus robust statistics were employed. All factor loadings were high ranging from .96 to .99 (see Figure 35).

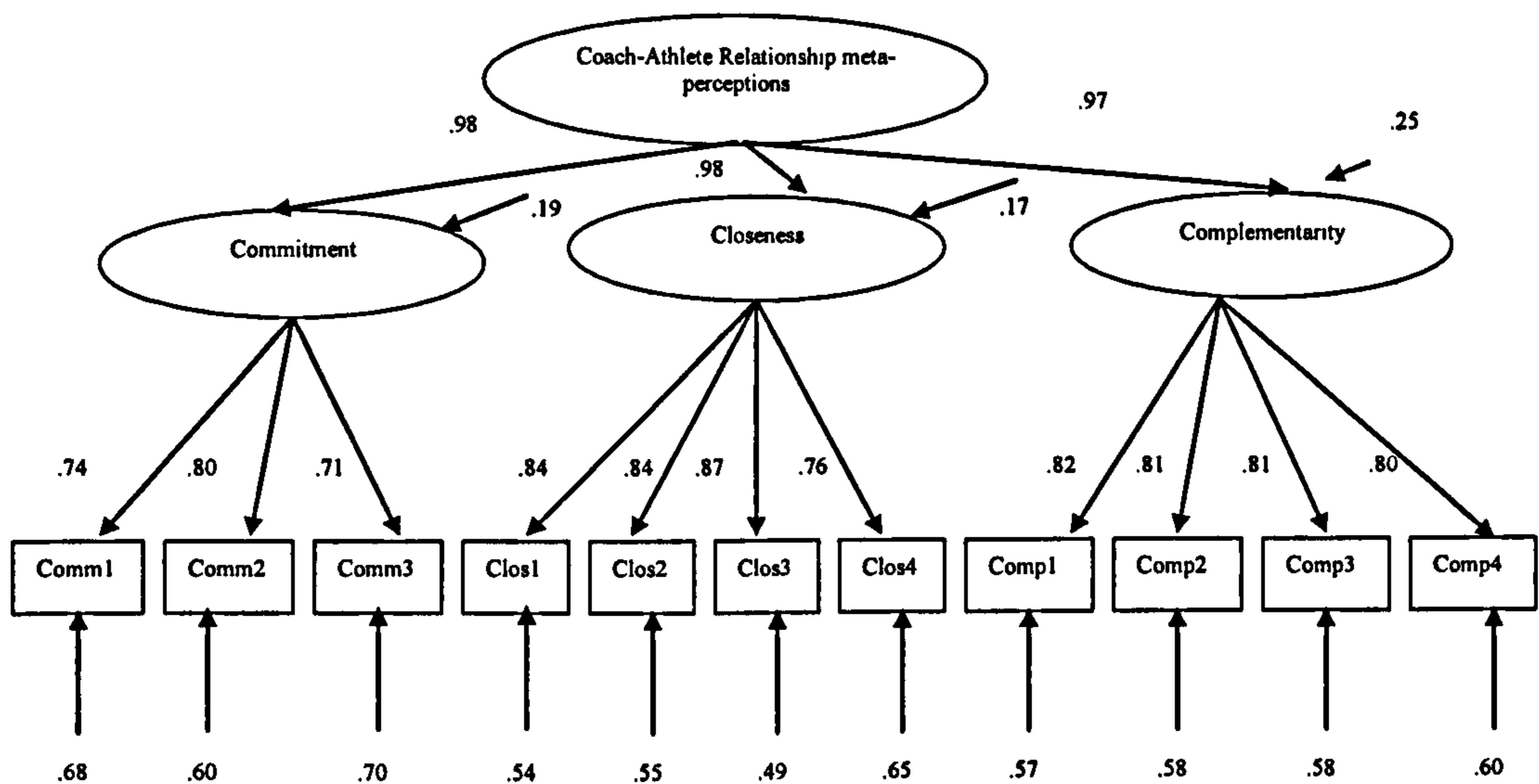
Figure 35:The second-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (self-perception version of the CART-Q).



Note: All parameters are standardized and significant ($p < .001$).

(b). For the CART-Q/ meta-perceptions version confirmatory factor analysis results showed that the second-order factor model fit the data marginally [$\chi^2(41)=466.842$, $p<0.01$; NNFI= .93; CFI= .95; SRMR= .04; RMSEA= .10]. Mardia's coefficient was high (55.91) indicating multivariate non-normality, thus robust statistics were employed. All factor loadings were high ranging from .97 to .98 (see Figure 36).

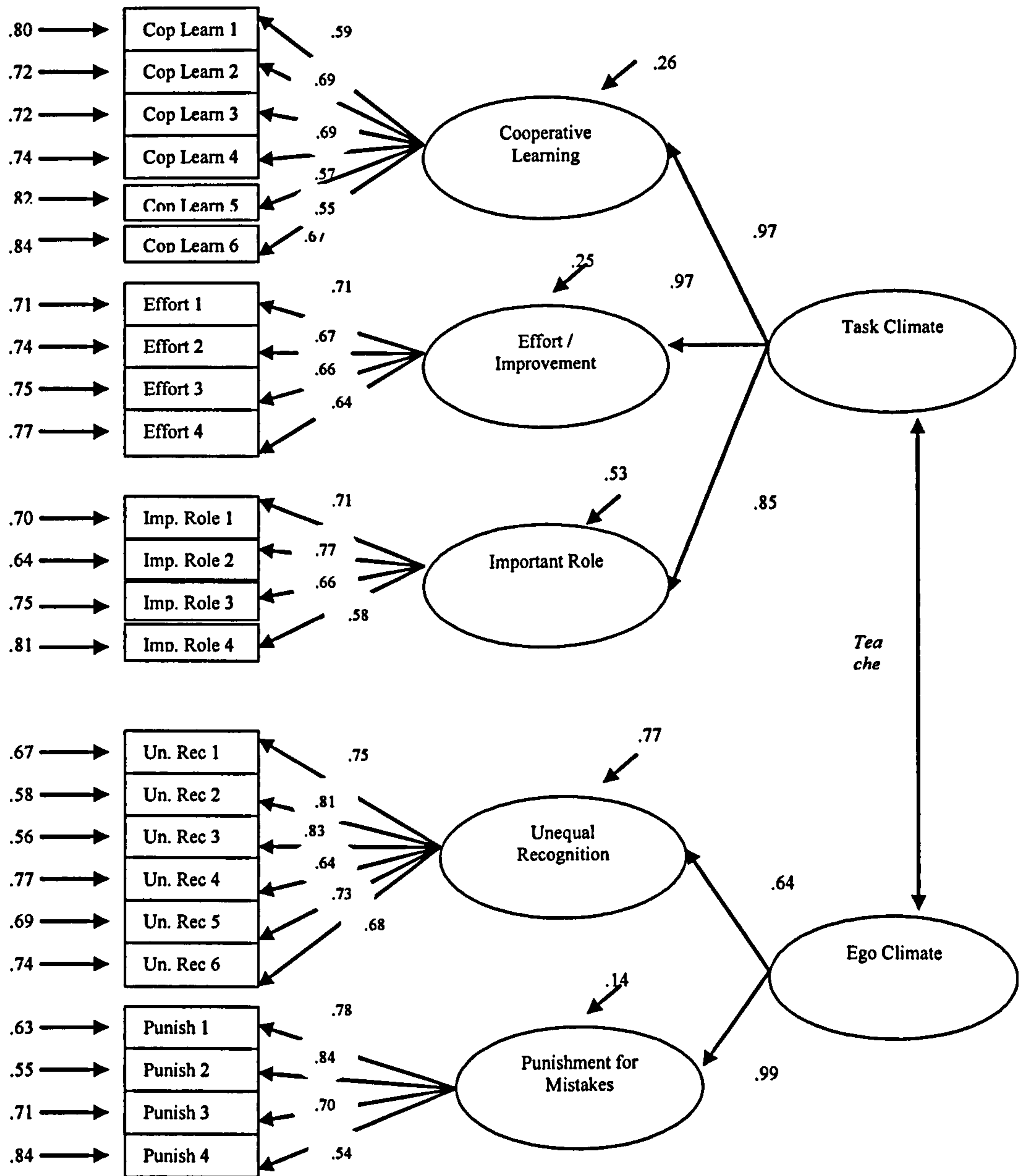
Figure 36:The second-order factor Coach-Athlete Relationship and the three first-order factors Commitment, Closeness, and Complementarity (meta-perception version of the CART-Q).



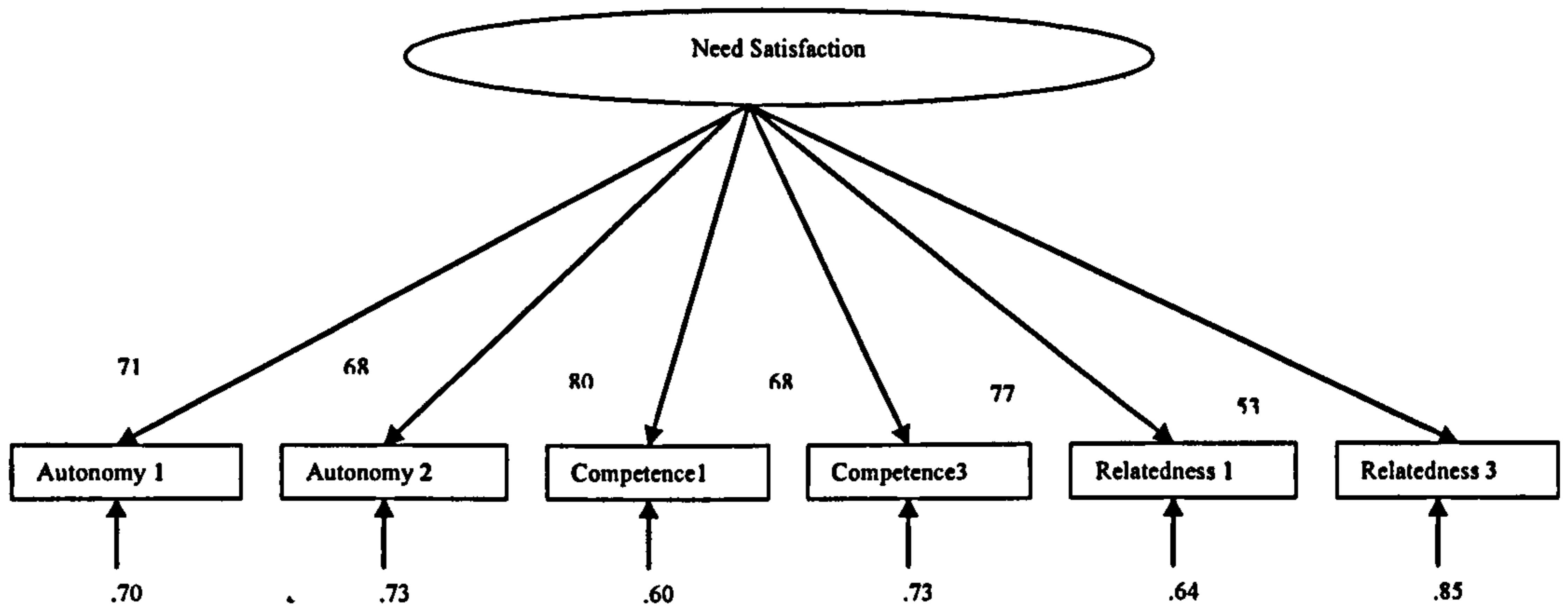
Note: All parameters are standardized and significant ($p < .001$).

(c). For the PMCSQ-2 confirmatory factor analysis results showed that the second-order factor model did not fit the data marginally [$\chi^2(247) = 1324.835$, $p < 0.01$; NNFI = .88; CFI = .89; SRMR = .08; RMSEA = .07]. Post hoc model fitting included three pairs of error covariances within the same subscales that were being allowed to correlate. The first pair of correlated errors involved two items from the unequal recognition subscale: "the coach has his/her favourites" and "the coach favours some players more than others". The second pair included two more items from the unequal recognition subscale: "only the top players 'get noticed' by the coach" and "only the players with the best 'skills' get praised". Whereas the third pair included two items from the Important Role subscale: "each player contributes in some important way" and "each player has an important role". These items seem to have very similar content; therefore, their measurement errors can be closely correlated (Pedhazur & Pedhazur-Schmelkin, 1991). In Newton et al.'s (2000) one of the post hoc fittings was the correlation of errors. The same pairs of errors were correlated. Confirmatory factor analysis after respecification of the model showed that the model fit the data well [$\chi^2(244) = 1016.764$, $p < 0.01$; NNFI = .91; CFI = .92; SRMR = .08; RMSEA = .06]. Mardia's coefficient was high (59.35) indicating multivariate non-normality, thus robust statistics were employed. All factor loadings were moderate to high ranging from .64 to .99 (see Figure 37).

Figure 37:The second-order factor Perceived motivational climate in sports and the five first-order factors Cooperative Learning, Effort/Improvement, Important Role, Unequal Recognition and Punishment for Mistakes (PMCSQ-2).



(d). For the NSS confirmatory factor analysis results showed that the first-order factor model fit the data marginally [$\chi^2(10) = 186.116$, $p < 0.01$; NNFI= .87; CFI= .92; SRMR= .05; RMSEA= .14]. Mardia's coefficient was high (23.66) indicating multivariate non-normality, thus robust statistics were employed. Item loadings ranged from .53 to .80 (See Figure 38).

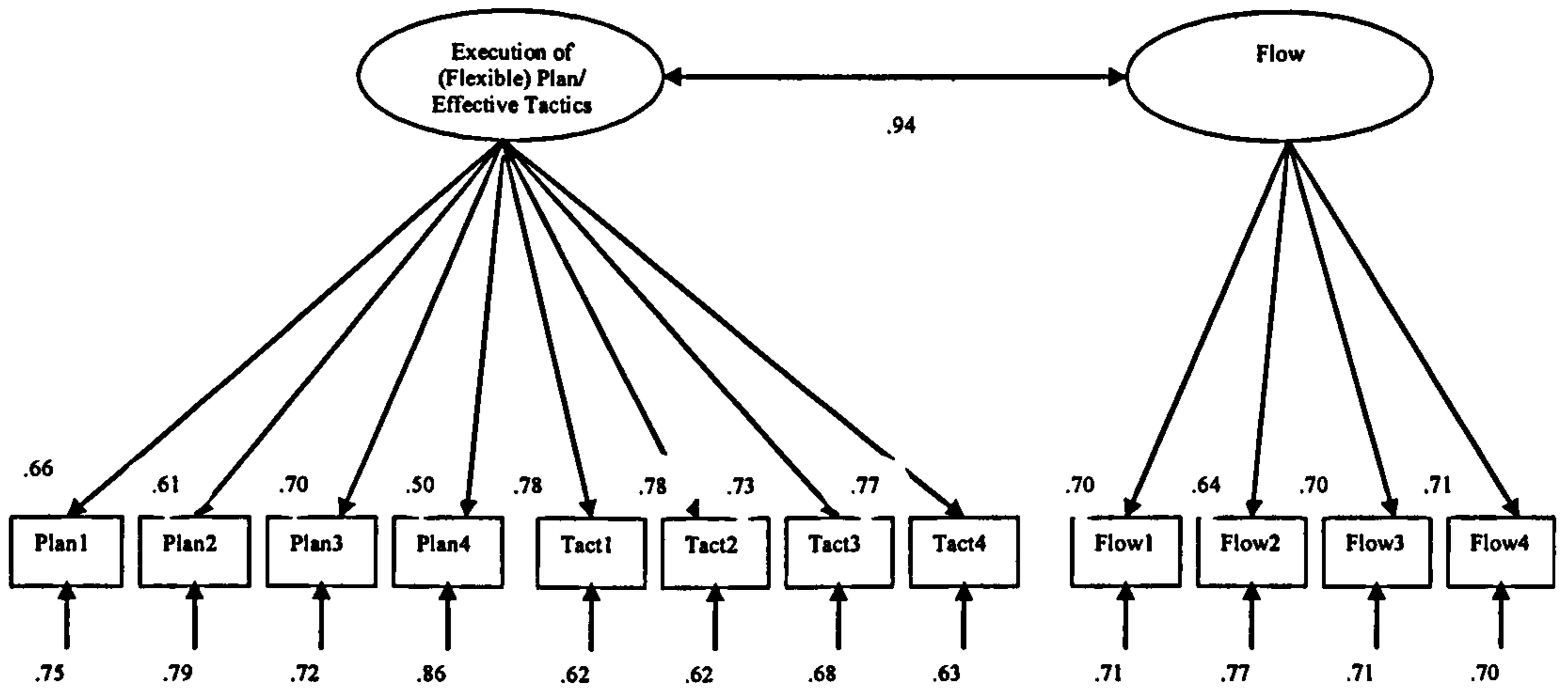
Figure 38: The one factor Need Satisfaction (NSS).

Note: All parameters are standardized and significant ($p < .001$).

(e). For the Performance questionnaire confirmatory factor analysis results showed that the three first-order factor model fit the data marginally [$\chi^2(52) = 635.091$, $p < 0.01$; NNFI = .87; CFI = .90; SRMR = .06; RMSEA = .11]. Although the model fit the data well, a closer examination of the standardised solution showed that the intercorrelation between the “Execution of Flexible Plan” and “Effective Tactics” subscales was over unity, suggesting that the two subscales were measuring the same concept. In Rees et al.’s (2000) study, it was shown that these three factors exhibited high interfactor correlations, ranging from .85 to .89.

Thus, post-hoc model fitting included the merging of the two subscales in one, reflecting athletes’ perceptions of performance-behaviours. Confirmatory factor analysis after respecification of the model showed that the model fit the data well [$\chi^2(54) = 653.868$, $p < 0.01$; NNFI = .87; CFI = .90; SRMR = .06; RMSEA = .11]. Mardia’s coefficient was high (64.33) indicating multivariate non-normality, thus robust statistics were employed. Item loadings ranged from .50 to .78 and factor correlation was .94 (see Figure 39).

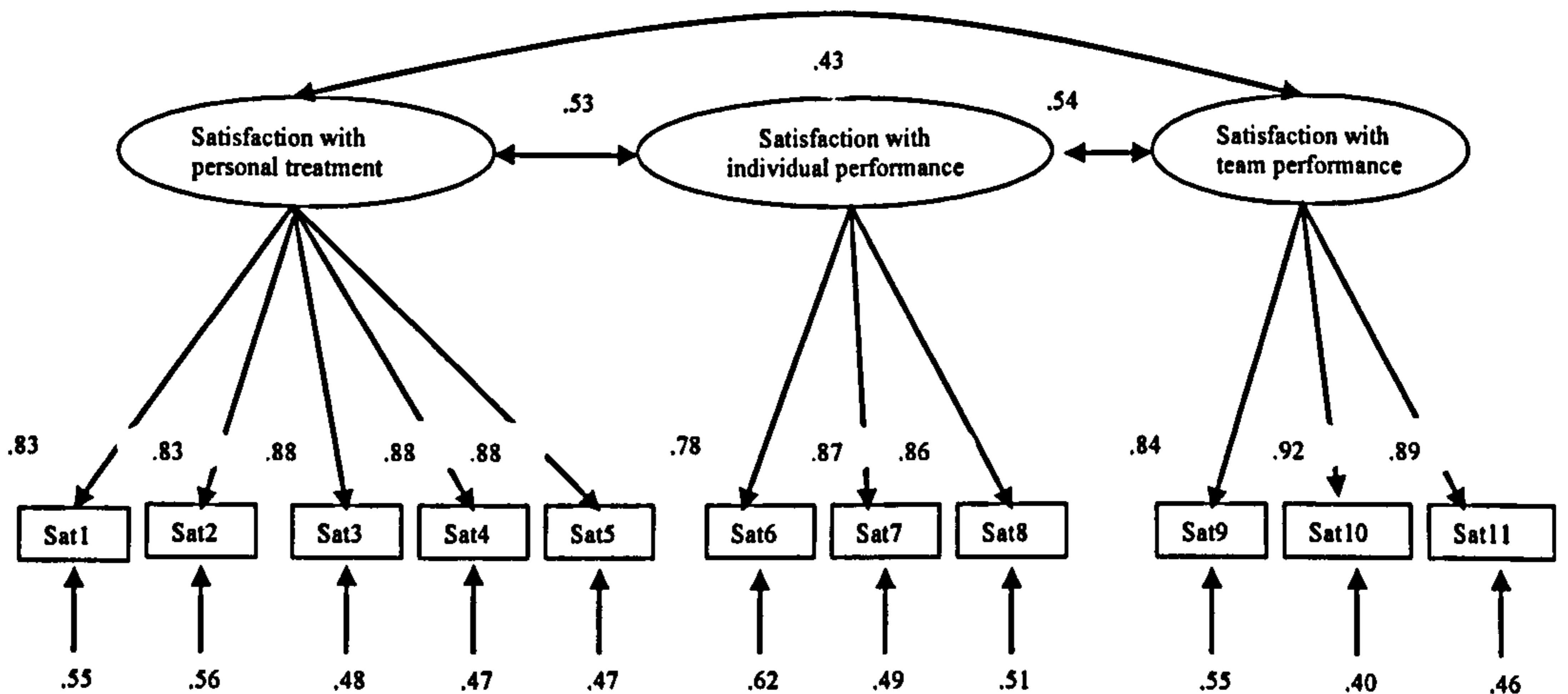
Figure 39: The two first-order factor model for the Perceived performance Scale.



Note: All parameters are standardized and significant ($p < .001$)

(f). For the ASQ confirmatory factor analysis results showed that the three first factor model fit the data well [$\chi^2(42) = 201.903$, $p < 0.01$; NNFI.97; CFI=.98; SRMR.03; RMSEA= .06]. Mardia's coefficient was high (62.05) indicating multivariate non-normality, thus robust statistics were employed. Item loadings ranged from .78 to .92 and factor correlations ranged from .43 to .54 (see Figure 40).

Figure 40: The three first-order factor model for the Athlete Satisfaction Questionnaire



Note: All parameters are standardized and significant ($p < .001$)

Table 30 summarises the CFA results for all the scales used in study 3c. Overall, results from CFA revealed that the factor structure of the instruments were good, thus proceeding to the next step which was the testing of the structural equation models.

Table 30: Fit Indexes of the CFA models for study 3c

| Scale | χ^2 | NNFI | CFI | SRMR | RMSEA |
|----------|------------------------|------|-----|------|---------------|
| CART-Q/S | $\chi^2(41)=687.170$ | .89 | .92 | .04 | .13 (.12 .14) |
| CART-Q/M | $\chi^2(41)=466.842$ | .93 | .95 | .04 | .10 (.10 .11) |
| PMCSQ-2 | $\chi^2(247)=1016.764$ | .91 | .92 | .08 | .06 (.06 .07) |
| NSS | $\chi^2(10)=186.116$ | .87 | .92 | .05 | .14 (.12 .15) |
| PPS | $\chi^2(54)=653.868$ | .87 | .90 | .06 | .11 (.10 .12) |
| ASQ | $\chi^2(42)=201.903$ | .97 | .98 | .03 | .06 (.05 .07) |

5.4.3.5 Structural Equation Models

The second step in SEM analysis, once the factor structure of each instrument utilised in the analysis has been confirmed is the building of a full structural model. Since the main objective in study 3 is to test for mediation, there should first be established that there is an association between the social factors measured (i.e., the coach-athlete relationship and the motivational climate) and the outcome variable (i.e., satisfaction). Thus, the following three models were tested:

- a) It was hypothesised that the athletes' self-perceptions of the coach-athlete relationship would positively influence satisfaction and performance.
- b) It was hypothesised that the athletes' meta-perceptions of the coach-athlete relationship would positively influence satisfaction and performance.
- c) It was hypothesised that the athletes' perceptions of a more task-involving motivational climate would positively influence satisfaction and performance. It was hypothesised that the athletes' perceptions of a more ego-involving motivational climate would negatively influence satisfaction and performance.

Once there was adequate fit of the aforementioned models to the data, need satisfaction was introduced as the mediating mechanism according to Self-Determination Theory. Thus, the following three SEM models were tested for each of the contextual factors:

1. It was hypothesised that satisfaction of the athletes' needs of autonomy, competence and relatedness, within the coach-athlete relationship context as it was perceived by athletes' self-perceptions, would be positively associated with their perceived performance and with their satisfaction with their personal treatment from the coach and with individual and team performance.
2. It was hypothesised that satisfaction of the athletes' needs of autonomy, competence and relatedness, within the coach-athlete relationship context as it was perceived by athletes' meta-perceptions, would be positively associated with their perceived performance and with their satisfaction with their personal treatment from the coach and with individual and team performance.
3. It was hypothesised that satisfaction of the athletes' needs within a task-involving motivational climate would be positively associated with their perceived performance and with their satisfaction with their personal treatment from the coach and with individual and team performance.
4. It was hypothesised that the satisfaction of the athletes' needs within an ego-involving motivational climate would be negatively associated with their perceived performance and with their satisfaction with their personal treatment from the coach and with individual and team performance.

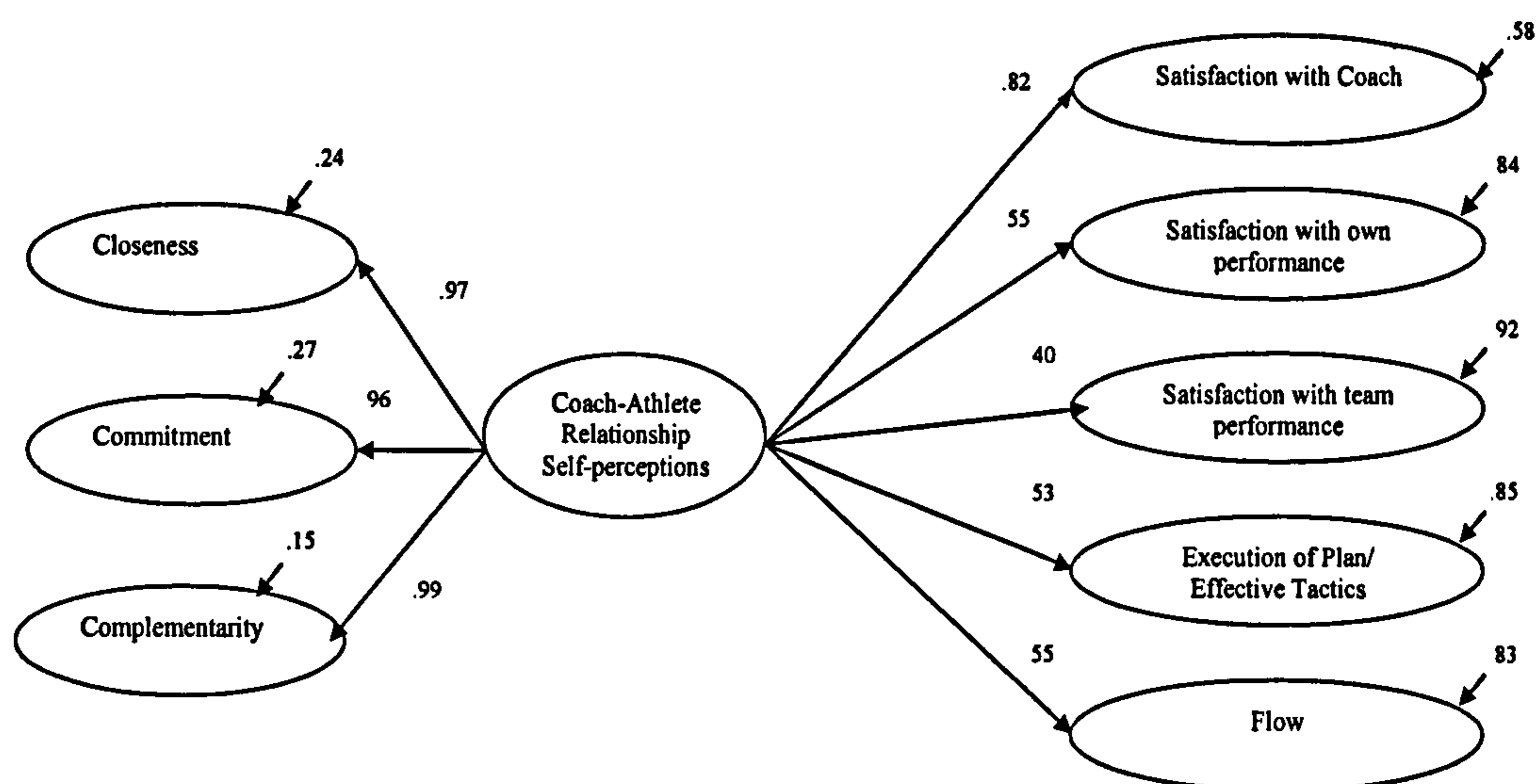
The same goodness of fit indices were used as in the other studies of this thesis for consistency and uniformity reasons.

Results

Model assessment

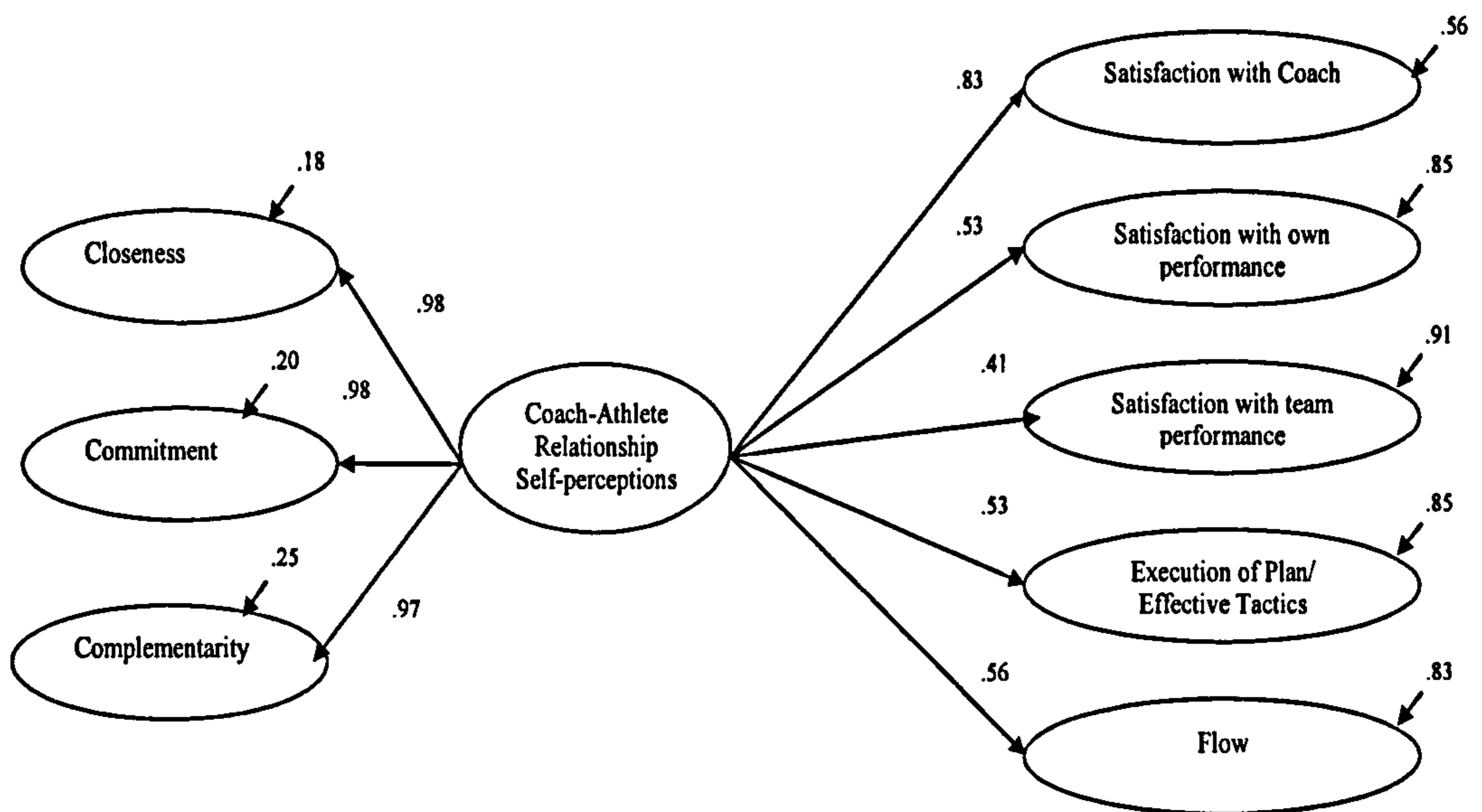
Self-perceptions of the coach-athlete relationship. For the first model including self-perceptions of the coach-athlete relationship, satisfaction and performance the imposed structure fit the data well: Sattora Bentler $\chi^2(510) = 1643.0013$, $p < 0.01$; NNFI=.92; CFI=.93; SRMR=.04; RMSEA= .05 (.05, .05). Path coefficients can be seen in Figure 41. All paths were statistically significant and in the expected direction. Self-perceptions of the coach-athlete relationship positively predicted types of satisfaction and performance. Correlations among the outcome variables ranged between .18 and .93.

Figure 41: Direct effects model of Self-perceptions of the coach-athlete relationship, satisfaction and performance



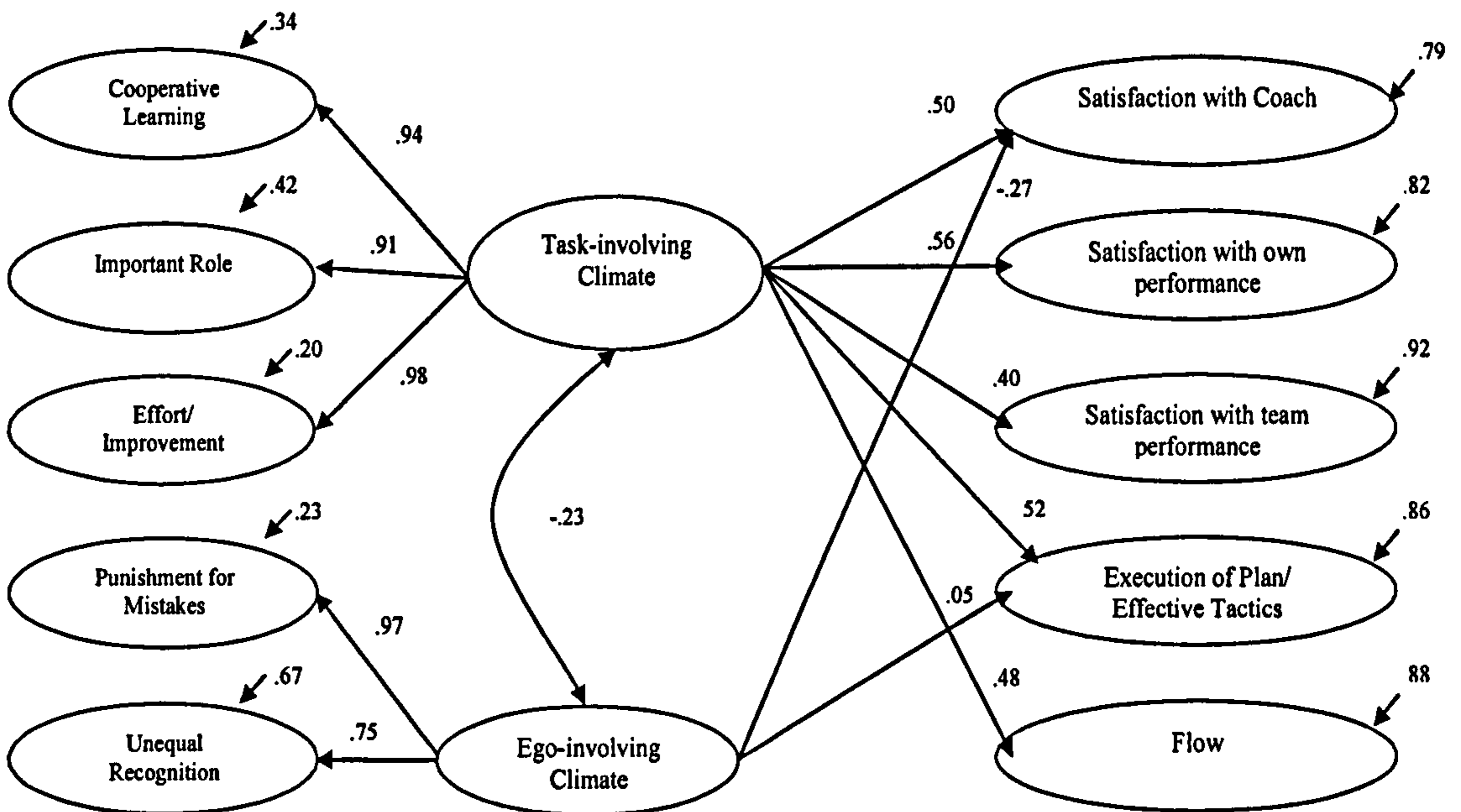
Meta-perceptions of the coach-athlete relationship. For the second model including meta-perceptions of the coach-athlete relationship, satisfaction and performance the imposed structure fit the data well: Sattora Bentler $\chi^2(510) = 1518.8186$, $p < 0.01$; NNFI=.93; CFI=.94; SRMR=.04; RMSEA= .05 (.04, .05). Path coefficients can be seen in Figure 42. All paths were statistically significant and in the expected direction. Meta-perceptions of the coach-athlete relationship positively predicted types of satisfaction and performance. Correlations among the outcome variables ranged between .18 and .93. Correlations among the outcome variables ranged between .18 and .93.

Figure 42: Direct effects model of Meta-perceptions of the coach-athlete relationship, satisfaction, and performance



Perceptions of motivational climate. The third model that included perceptions of the motivational climate, satisfaction and performance fit the data well: Sattora-Bentler $\chi^2(1006) = 2395.3109$, $p < 0.01$; NNFI=.92; CFI=.93; SRMR=.05; RMSEA= .04 (.04, .04). A close examination of the standardised solution and the Lagrange Multiplier Test revealed that the paths from the ego-involving climate to satisfaction with own performance and satisfaction with team performance as well as execution of flexible plan/effective tactics were non-significant. The model was respecified omitting the three paths and was rerun. The modified model fit the data well: Sattora-Bentler $\chi^2(1009) = 2398.8156$, $p < 0.01$; NNFI=.92; CFI=.93; SRMR=.05; RMSEA= .04 (.04, .04). Path coefficients can be seen in Figure 43. Correlations among the outcome variables ranged between .31 and .93.

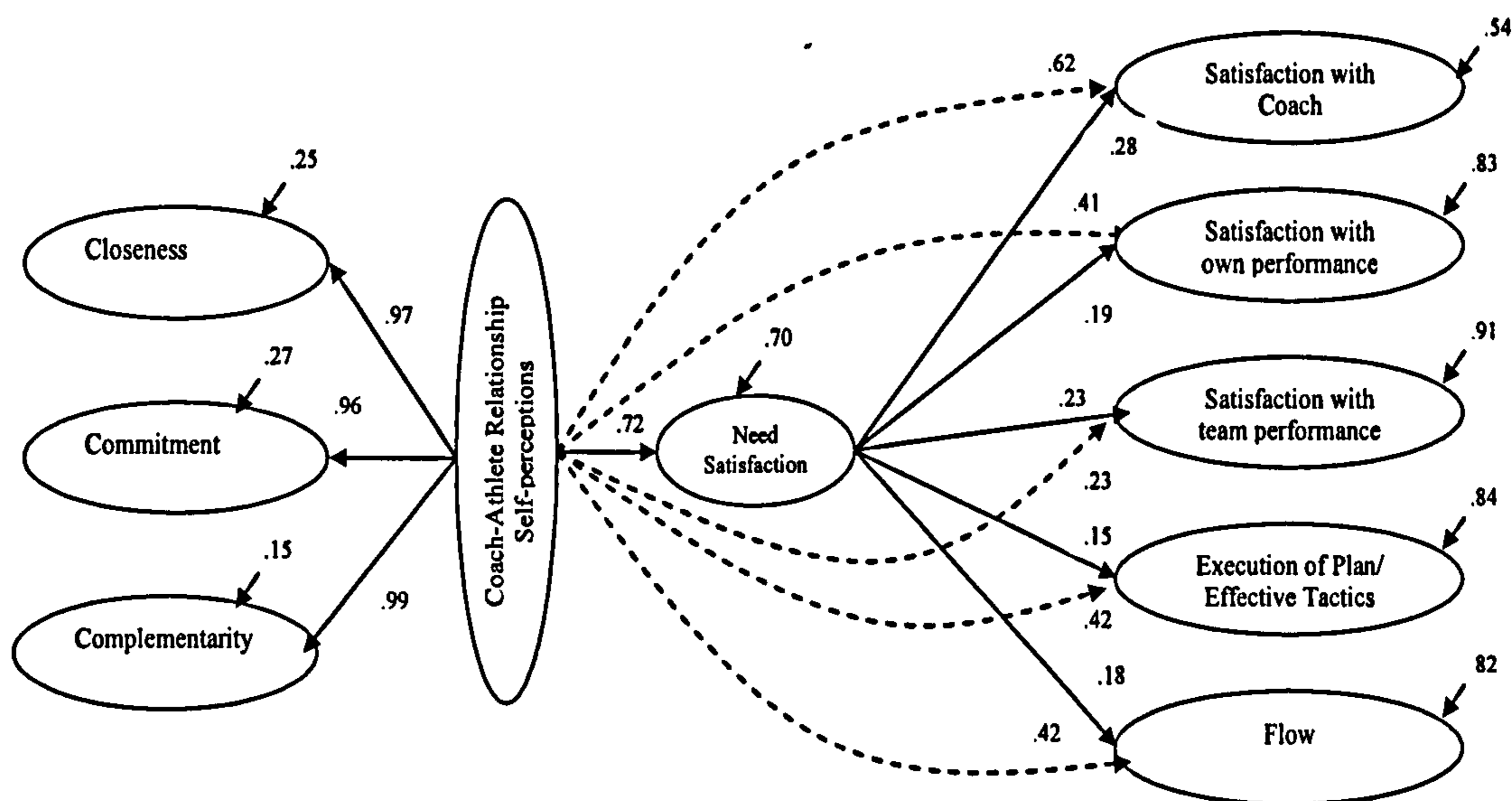
Figure 43: Direct effects model for perceptions of the motivational climate, satisfaction, and performance



Since the direct effect models showed a good fit to the data and since it was shown that the independent variables had a significant influence on the outcome variables, in the second step, the models were extended to include the predictor variable.

Self-perceptions of the coach-athlete relationship. For the first model, confirmatory factor analysis results showed that the model fit the data well [Sattora Bentler $\chi^2(716) = 2092.9495$, $p < 0.01$; CFI=.93; NNFI=.92; SRMR=.04; RMSEA= .05(.04, .05)]. Self-perceptions of the coach athlete relationship positively correlated with need satisfaction and explained 64% of the variance in needs. Need satisfaction positively predicted all dimensions of athletes' satisfaction and the two dimensions of subjective performance. Specifically, needs explained 64% of the variance in satisfaction with personal treatment, 29% of the variance in satisfaction with individual performance, 18% of the variance in satisfaction with team performance, 25% of the variance in subjective performance regarding execution of flexible plan /effective tactics, and 28% of variance in flow as a measure of subjective performance. Correlations among the subscales of the outcome variables ranged from .14 to .95. Loadings and paths are shown in Figure 44.

Figure 44: Mediational Model for self-perceptions of the coach-athlete relationship, need satisfaction, satisfaction, and performance



To confirm the mediational role of need satisfaction the path from self-perceptions of the coach-athlete relationship to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled $\chi^2(717) = 2466.9813$, $p < .001$, CFI = .91, NNFI = .90, SRMR = .15, RMSEA = .05 (.05, .05). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2(1, n=755) = 374.0318$, $p < .001$).

Table 31 shows the total, direct, and indirect paths obtained from the mediational model. The results suggested that need satisfaction mediated partially the relationship between the coach-athlete relationship and satisfaction and performance. When controlling for need satisfaction, the direct effect of self-perceptions of the coach-athlete relationship on Satisfaction with the coach dropped (from .867, $se = .036$, $t = 24.251$ to .652, $se = .041$, $t = 15.845$). The same pattern for the direct effect of self-perceptions of the coach-athlete relationship was monitored for all types of satisfaction: for Satisfaction with individual performance the path dropped from .565, $se = .037$, $t = 15.163$ to .424, $se = .052$, $t = 8.091$; for Satisfaction with team performance the path dropped from .503, $se = .044$, $t = 11.321$ to .294, $se = .066$, $t = 4.443$; for Execution of Flexible Plans/Effective Tactics the path dropped from .494, $se = .035$,

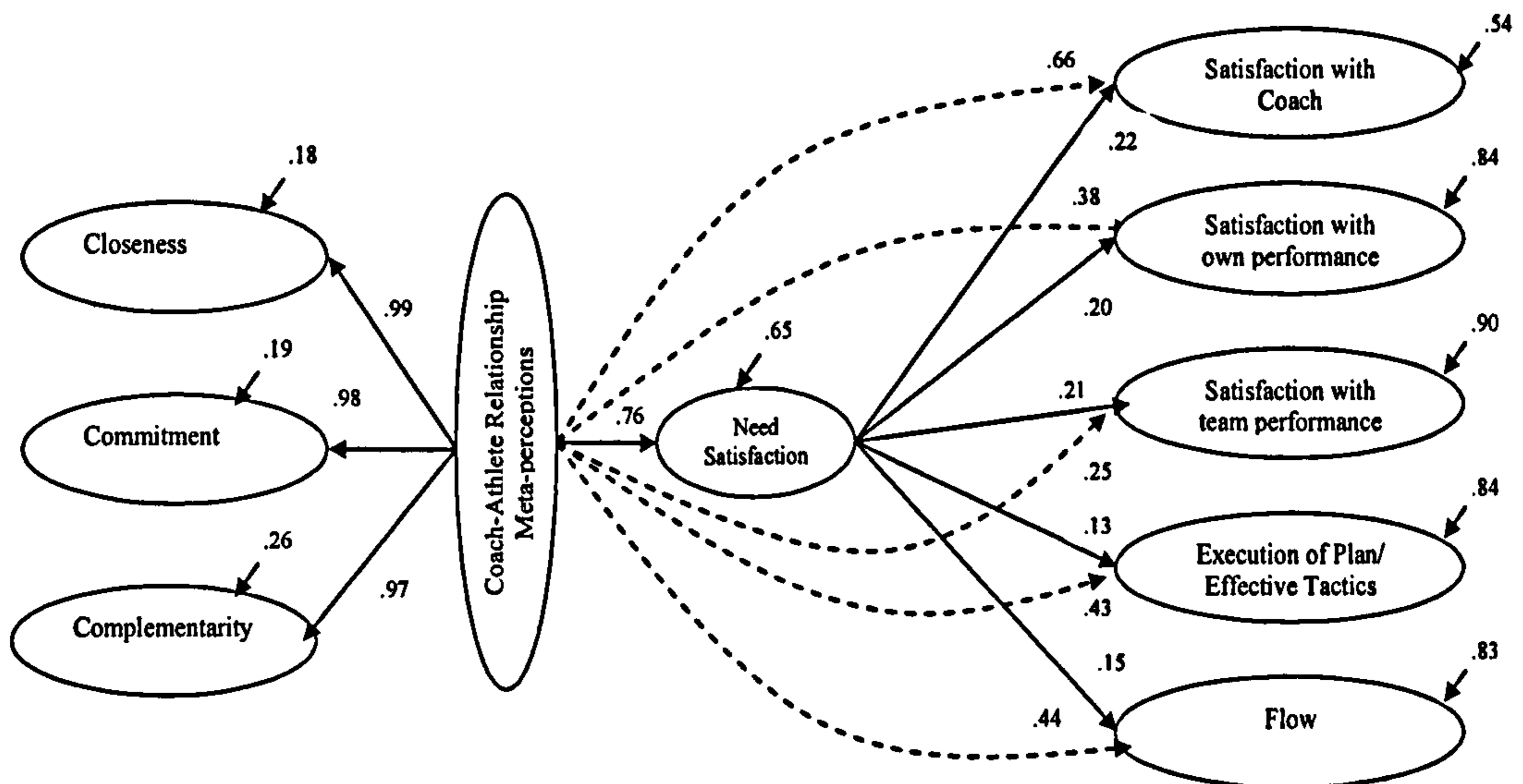
t=14.173 to .392, se=.048, t=8.128; and for Flow the path dropped from .470, se=.034, t=13.950 to .360, se=.047, t=7.658.

Table 31: Total, Direct, and Indirect effects of self-perceptions of the coach-athlete relationship on Satisfaction and Performance

| | | Total effects of the Coach-athlete relationship/ self- perceptions | Direct effects of the Coach-athlete relationship/ self- perceptions | Indirect effects of the Coach-athlete relationship/ self- perceptions |
|--|----|---|--|--|
| Satisfaction with the coach | | .867 | .652 | .216 |
| | se | .036 | .041 | .028 |
| | t | 24.251* | 15.845* | 7.628* |
| Satisfaction with own performance | | .565 | .424 | .141 |
| | se | .037 | .052 | .038 |
| | t | 15.163* | 8.091* | 3.717* |
| Satisfaction with team performance | | .503 | .294 | .209 |
| | se | .044 | .066 | .049 |
| | t | 11.321* | 4.443* | 4.234* |
| Execution of Plan/Effective Tactics | | .494 | .392 | .102 |
| | se | .035 | .048 | .034 |
| | t | 14.173* | 8.128* | 2.972* |
| Flow | | .470 | .360 | .110 |
| | se | .034 | .047 | .034 |
| | t | 13.950* | 7.658* | 3.275* |

Meta-perceptions of the coach-athlete relationship. For the second model, confirmatory factor analysis results showed that the model fit the data well [Sattora Bentler $\chi^2(716) = 1968.7376$, $p < 0.01$; NNFI=.93; CFI=.94; SRMR=.04; RMSEA= .04(.04, .05)]. Meta-perceptions of the coach athlete relationship positively correlated with need satisfaction and explained 70% of the variance in needs. Need satisfaction positively predicted all dimensions of athletes' satisfaction and the two dimensions of subjective performance. Specifically, needs explained 65% of the variance in satisfaction with personal treatment, 28% of the variance in satisfaction with individual performance, 18% of the variance in satisfaction with team performance, 25% of the variance in subjective performance regarding execution of flexible plan /effective tactics, and 29% of variance in flow as a measure of subjective performance. Correlations among the subscales of the outcome variables ranged from .16 to .95. Loadings and paths are shown in Figure 45.

Figure 45: Mediational model for meta-perceptions of the coach-athlete relationship, need satisfaction, satisfaction, and performance



To confirm the mediational role of need satisfaction the path from perceptions of the motivational climate to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled $\chi^2 (717) = 2413.4455$, $p < .001$, CFI = .91, NNFI = .90, SRMR = .16, RMSEA = .05 (.05, .05). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2 = (1, n=755) = 444.7079$, $p < .001$).

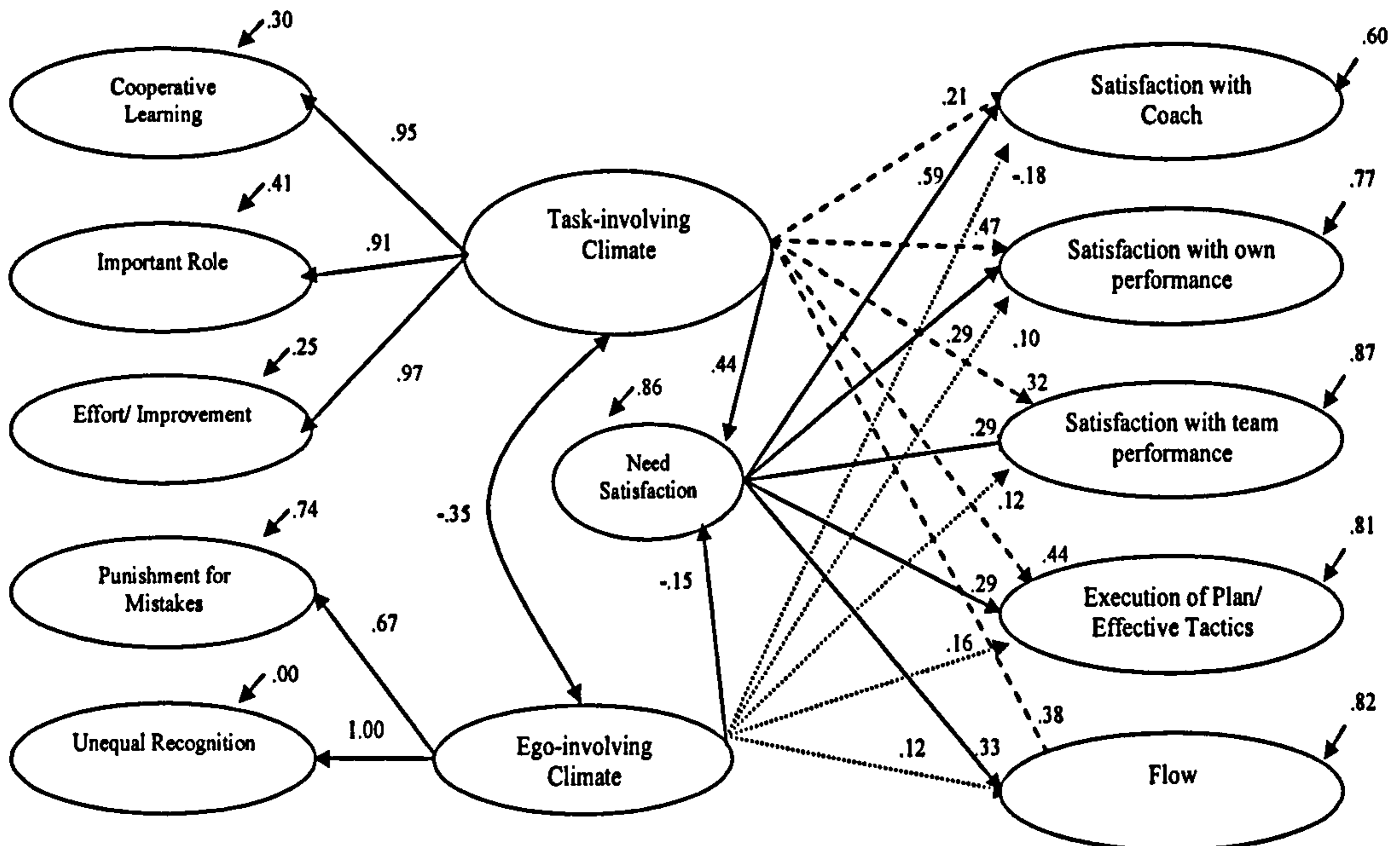
Table 32 shows the total, direct, and indirect paths obtained from the mediational model. The results suggested that need satisfaction mediated partially the relationship between the coach-athlete relationship and satisfaction and performance. When controlling for need satisfaction, the direct effect of meta-perceptions of the coach-athlete relationship on Satisfaction with the coach dropped (from .878, $se=.036$, $t=24.579$ to .698, $se=.045$, $t=15.533$). The same pattern for the direct effect of meta-perceptions of the coach-athlete relationship was monitored for all types of satisfaction: for Satisfaction with individual performance the path dropped from .545, $se=.037$, $t=14.657$ to .392, $se=.058$, $t=6.817$; for Satisfaction with team performance the path dropped from .519, $se=.044$, $t=11.720$ to .318, $se=.072$, $t=4.404$; for Execution of Flexible Plans/Effective Tactics the path dropped from .492, $se=.035$, $t=14.144$ to .400, $se=.053$, $t=7.597$; and for Flow the path dropped from .474, $se=.034$, $t=14.076$ to .377, $se=.051$, $t=6.825$.

Table 32: Total, Direct, and Indirect effects of meta-perceptions of the coach-athlete relationship on satisfaction and performance

| | | Total effects of the Coach-athlete relationship/ meta- perceptions | Direct effects of the Coach-athlete relationship/ meta- perceptions | Indirect effects of the Coach-athlete relationship/ meta- perceptions |
|--|----|---|--|--|
| Satisfaction with the coach | | .878 | .698 | .180 |
| | se | .036 | .045 | .032 |
| | t | 24.579* | 15.533* | 5.680* |
| Satisfaction with own performance | | .545 | .392 | .153 |
| | se | .037 | .058 | .044 |
| | t | 14.657* | 6.817* | 3.444* |
| Satisfaction with team performance | | .519 | .318 | .201 |
| | se | .044 | .072 | .057 |
| | t | 11.720* | 4.404* | 3.539* |
| Execution of Plan/Effective Tactics | | .492 | .400 | .092 |
| | se | .035 | .053 | .040 |
| | t | 14.144* | 7.597* | 2.319* |
| Flow | | .474 | .377 | .096 |
| | se | .034 | .051 | .039 |
| | t | 14.076* | 6.825* | 2.483* |

Perceptions of motivational climate. For the third model, confirmatory factor analysis results showed that the model fit the data well [Sattora Bentler $\chi^2(1288) = 2861.2238$, $p < 0.01$; NNFI=.92; CFI=.93; SRMR=.05; RMSEA= .04(.03, 04)]. Correlations among the subscales of the outcome variables ranged from .19 to .93. Loadings and paths are shown in Figure 46. Correlations among the outcome variables ranged between .12 and .94.

Figure 46: Mediating Model of perceptions of Motivational Climate, need satisfaction, satisfaction, and performance



To confirm the mediational role of need satisfaction the path from perceptions of the motivational climate to need satisfaction was removed. The model was rerun and results showed that it did not fit the data well: Satorra-Bentler scaled χ^2 (1290) = 3091.6705, $p < .001$, CFI = .92, NNFI = .91, SRMR = .09, RMSEA = .04 (.04, .04). A comparison between the two models (with and without the path) showed that the model with the mediating path was significantly better than the one with this path removed ($\Delta \chi^2 = (1, n=755) = 230.4467 p < .001$).

Results suggested that need satisfaction mediated partially the relationship between motivational climate and satisfaction and performance. When controlling for need satisfaction, the direct effect of task-involving motivational climate on Satisfaction with the coach dropped from .500, $se = .037$, $t = 13.385$ to .227, $se = .033$, $t = 6.832$. The same pattern for the direct effect of task-involving motivational climate was monitored for all types of satisfaction and performance: for Satisfaction with individual performance the path dropped from .611, $se = .041$, $t = 14.959$ to .479, $se = .042$, $t = 11.407$; for Satisfaction with team performance the path dropped from .568, $se = .049$, $t = 11.534$ to .408, $se = .053$, $t = 7.753$; for Execution of Flexible Plans/Effective Tactics the path dropped from .516, $se = .038$, $t = 13.504$ to .399, $se = .039$, $t = 10.226$; and for Flow the path dropped from .441, $se = .037$, $t = 11.987$ to .318, $se = .038$, $t = 8.378$.

When controlling for need satisfaction, the direct effect of ego-involving motivational climate on Satisfaction with the coach dropped from $-.288$, $se=.035$, $t=-8.181$ to $.120$, $se=.028$, $t=4.386$. For Satisfaction with individual performance the path increased from $.057$, $se=.036$, $t=1.595$ to $.102$, $se=.035$, $t=2.926$; for Satisfaction with team performance the path increased from $.096$, $se=.046$, $t=2.067$ to $.151$, $se=.046$, $t=3.300$; for Execution of Flexible Plans/Effective Tactics the path increased from $.105$, $se=.033$, $t=3.184$ to $.145$, $se=.032$, $t=4.478$; and for Flow the path increased from $.061$, $se=.033$, $t=1.853$ to $.103$, $se=.032$, $t=3.196$. Table 33 shows the total, direct, and indirect paths obtained from the mediational model.

Table 33: Total, Direct, and Indirect effects of motivational climate on satisfaction and performance

| | | Total effects of Task-involving climate | Direct effects of Task-involving climate | Indirect effects of Task-involving climate | Total effects of Ego-involving climate | Direct effects of Ego-involving climate | Indirect effects of Ego-involving climate |
|-------------------------------------|----|---|--|--|--|---|---|
| Satisfaction with the coach | | .500 | .227 | .273 | -.288 | -.195 | -.093 |
| | se | .037 | .033 | .028 | .035 | .029 | .023 |
| | t | 13.385* | 6.832* | 9.765* | -8.181 | -6.669* | -3.959* |
| Satisfaction with own performance | | .611 | .479 | .132 | .057 | .102 | -.045 |
| | se | .041 | .042 | .020 | .036 | .035 | .013 |
| | t | 14.959* | 11.407* | 6.594* | 1.595 | 2.926* | -3.514* |
| Satisfaction with team performance | | .568 | .408 | .160 | .096 | .151 | -.055 |
| | se | .049 | .053 | .026 | .046 | .046 | .016 |
| | t | 11.534* | 7.753* | 6.209* | 2.067* | 3.300* | -3.468* |
| Execution of Plan/Effective Tactics | | .516 | .399 | .117 | .105 | .145 | -.040 |
| | se | .038 | .039 | .018 | .033 | .032 | .012 |
| | t | 13.504* | 10.226* | 6.384* | 3.184* | 4.478* | -3.473* |
| Flow | | .441 | .318 | .123 | .061 | .103 | -.042 |
| | se | .037 | .038 | .019 | .033 | .032 | .012 |
| | t | 11.987* | 8.378* | 6.534* | 1.853 | 3.196* | -3.524* |

Cumulative results of the structural equation models tested in Study 3c are presented in Table 34.

Table 34: Fit indexes for the second step in SEM analysis for Study 3c

| Model | χ^2 | NNFI | CFI | SRMR | RMSEA with 90% CI |
|---|--------------------------|------|-----|------|-------------------------|
| CART-Q/s, NSS, ASQ, PQ (mediational model) | $\chi^2(716)=2092.9495$ | .92 | .93 | .04 | .05 (.04 .05) |
| CART-Q/s, NSS, ASQ, PQ (non-mediational model) | $\chi^2(717)=2466.9813$ | .90 | .91 | .15 | .05 (.05 .05) |
| CART-Q/m, NSS, ASQ, PQ (mediational model) | $\chi^2(716)=1968.7376$ | .93 | .94 | .04 | .04 (.04 .05) |
| CART-Q/m, NSS, ASQ, PQ (non-mediational model) | $\chi^2(717)=2413.4455$ | .90 | .91 | .16 | .05 (.05 .05) |
| PMCSQ-2, NSS, ASQ, PQ (mediational model) | $\chi^2(1288)=2861.2238$ | .92 | .93 | .05 | .04 (.03 .04) |
| PMCSQ-2, NSS, ASQ, PQ (non-mediational model) | $\chi^2(1290)=3091.6705$ | .91 | .92 | .09 | .04 (.04 .04) |

5.4.4 Discussion

The aim of study 3c was to examine the mediating role of the athletes' satisfaction of the needs for autonomy, competence and relatedness, in the relationship between social contexts and affective and behavioural outcome variables. Overall, the present findings supported the hypotheses that perceptions of an effective coach-athlete relationship and a task-involving motivational climate would be positively associated with need satisfaction, higher levels in different facets of athletes' satisfaction and higher performance. Specifically, results showed that athletes who perceived higher levels of their needs in an effective coach-athlete relationship and a task-involving motivational climate, perceived higher satisfaction with personal treatment from their coach, and satisfaction with individual and team performance, were able to apply a more flexible plan and more effective tactics in their game and experienced higher levels of flow.

The associations between social contexts and need satisfaction and between need satisfaction and outcome variables will be discussed separately. The results on the associations between social contexts and athletes' need satisfaction were consistent with the two previous studies of this thesis and with previous literature. Perceptions of a task-involving motivational climate were found to be positively associated with Olympiou 2006

athletes' psychological needs, whereas perceptions of an ego-involving motivational climate were found to be negatively associated with athletes' need satisfaction providing further evidence on previous achievement goal research (Standage et al., 2003; Reinboth et al., 2004). With regards to the association between athletes' perceptions of the coach-athlete relationship and satisfaction of the three needs no previous research has been conducted. On the other hand, coaching behaviours in terms of autonomy support, social support and mastery focus have been found to be positively associated with the three needs and in turn on intrinsic satisfaction (Reinboth et al., 2004). Although social support and coach-athlete relationship are not identical constructs, they are comparable. It is assumed that in an effective coach-athlete relationship the athlete and the coach will feel close, so if trust like and respect are mutual and present it is expected that the coach will care for the welfare of the athlete and provide social support.

Need satisfaction within all three social contexts, accounted for more variance in the dimension of satisfaction with personal treatment from the coach (ranging from 60% to 65%) than in satisfaction with individual (ranging from 27% to 29%) and team performance (ranging from 17% to 18%). Overall, these findings were expected due to the nature of the three dimensions examined, and are consistent with previous literature. Athletes who perceive higher levels of their relationship needs in a social environment that promotes task involvement and high levels of closeness, commitment and complementarity, are more likely to feel more satisfaction with the coach's behaviours, feedback and support; they also perceive that part of their satisfaction with individual and team performance is associated with their coach-athlete relationship or the coaching environment and the degree to which it satisfies their psychological needs. The lowest variance explained in the model was satisfaction with team performance. This finding is partially consistent with Balaguer et al.'s (2002) findings where it was shown that perceptions of a task- and ego-involving climate did not predict perceived improvement with team performance, and satisfaction with results. Balaguer et al. commented "it might be that judgements regarding progress in team performance are more intimately linked to objective competitive team outcomes than the goal emphases conveyed in the subjective team environment" (p. 304). In the present study, a small but substantial amount of variance was explained by the social contexts compared to Balaguer et al.'s findings. It might

be as well, that other variables affect perceptions of satisfaction with individual and team performance. Athletes are again less likely to perceive that their whole actual performance can be explained through the satisfaction of their needs in such environments. The amount of variance explained in the models tested in the behavioural aspect of performance ranged from 22% to 25%, whereas the amount of variance in flow ranged from 25% to 29%. Performance assessment involves so many aspects, psychological, technical, tactical, and situational, that the mere fact that the present study showed a 22% to 29% variance explained by the certain aspects of the social environment is very encouraging.

On the contrary, when athletes perceived a more ego-involving motivational climate, and lower levels of the 3 Cs perceived lower levels in their need satisfaction and also lower levels in several dimensions of satisfaction and performance. Athletes who perceived that their coach put more emphasis on normative ability and winning at all costs, by punishing them for their mistakes and ignoring the less-abled athletes, perceived less trust and respect for their coach, less commitment to their athletic relationship and less cooperation during trainings, revealed less competence, felt more distant in their relationship with their coach and felt that they had less freedom of choice and self-control. In this situation, athletes demonstrated less satisfaction with the treatment they received from their coach, they viewed the coach as less friendly, and providing less positive feedback. They also perceived lower levels of their performance and lower levels in the use of effective strategies and feelings of flow. Nevertheless, due to the low explained unique variance in need satisfaction (loading of $-.18$) accounted by the ego-involving motivational climate, implications of these findings should be interpreted with caution.

Ommundsen et al. (1999) as well as Walling et al. (1993) have found similar results. In both studies it was shown that perceptions of an ego-involving climate that is based on superior ability and surpassing others, was associated with lower levels of satisfaction. Satisfaction was conceptualised in terms of task versus ego sources of satisfaction derived from social approval from the coach and peers in the former study, and team satisfaction in the latter. Task-involving climate on the contrary was found to be positively associated with intrinsic satisfaction (Treasure & Roberts, 2001). Task-involving motivational climate has also been found to be related to satisfaction with performance and performance improvement (Balaguer et al., 2002) and

satisfaction with competitive results and current level of play as well as subjective performance (Balaguer et al., 1999). Thus, the present results are in the same direction with achievement goal literature's findings, with perceptions of a task-involving motivational climate leading to more positive and adaptive results (i.e., higher satisfaction and performance), and an ego-involving climate leading to less positive and less adaptive athletes' responses (i.e., lower satisfaction and lower performance).

The mechanism through which motivational climate was seen to predict outcomes is the satisfaction of the basic psychological needs suggested by SDT (Deci & Ryan, 1985, 2000) and in particular the needs sub-theory (Ryan & Deci, 2000). Once the athletes felt more competent, more related to their coach and perceived higher autonomy in their relationship with their coach, it was shown that they performed better, and they felt more satisfied with the personal treatment from their coach. Although SDT concentrates on well-being outcomes, it is suggested here, that social contexts through the satisfaction of the basic needs were positively associated with athletes' optimal functioning and in turn lead with well-being. Satisfaction and flow can be seen as indicators of well-being. Thus, the present results support SDT tenets.

Present findings are also in accordance with previous research showing that coach's behaviours affect satisfaction and performance in terms of win/loss percentage (Weiss & Friedrichs, 1986). More specifically, it was shown that training and instruction, rewarding behaviour, social support, and democratic behaviour were all associated with athletes' satisfaction with their teammates, whereas autocratic behaviour was associated with satisfaction with the amount of basketball-related work. Social support and rewarding behaviour also predicted performance in terms of wins/loss percentage. Although these satisfaction results come from a scale that was adapted from the industrial organisational domain, certain similarities can be drawn with the present findings. Athletes who perceived more closeness in their relationship with their coach are comparable to those who perceived more social support from their coach in Weiss and Friedrichs' study; thus, athletes in both situations felt more satisfied and experienced greater performance. Results point to the conclusion that the relational context, and especially when the coach cares about the athletes produces positive and adaptive, affective and behavioural patterns.

From a self-determination perspective, autonomy, competence and relatedness have been found to affect flow in sport (Kowal & Fortier, 1999). Although flow was

measured multidimensionally in the previous research, according to Csikszentmihalyi (1990) and Jackson and Marsh (1996) it bears some similarities with the concept of flow that was used in the present study as an indicator of subjective performance. Both concepts dealt with and entailed the elements of concentration of the task at hand, and autotelic experience. In both studies, athletes reported that they stayed more focused and enjoyed the game more. Kowal and Fortier (1999) found that only the feelings of competence and feelings of being united with other people around them, led athletes to experience state of flow. Autonomy was not found to contribute to the prediction of flow. In conclusion study 3C provided further support for the influence of the social context on the fulfilment of the psychological needs and on performance and satisfaction outcomes.

5.5 General Discussion of Study 3

Study 3 provided a comprehensive examination of the application of the need theory (Ryan & Deci, 2000) that was incorporated with achievement goal theory (Ames, 1992; Duda, 2001; Nicholls, 1989, 1992) and the 3+1 Cs conceptualisation of the coach-athlete relationship (Jowett, 2005; Jowett & Meek, 2000; Jowett & Ntoumanis, 2004). Athletes reported that their needs for competence, relatedness, and autonomy were more gratified in social contexts characterised by more task-involving cues, and higher levels of closeness, commitment, and complementarity. They also reported that the satisfaction of these needs was lower in social contexts characterised by more ego-involving motivational cues, and lower levels of closeness, commitment and complementarity.

With regards to the relationship between social contexts and needs, the present results indicated that a task-involving climate was positively associated with the satisfaction of these three needs. Theoretical and empirical evidence provides support for these findings, where it has been explicated that in a task-involving climate, an undifferentiated conception of ability is endorsed (Ames, 1992; Duda, 2001; Nicholls, 1989). Individuals are encouraged to use self-referenced criteria to judge their competence (Ntoumanis & Biddle, 1999). Since the focus of the training is on learning and mastering of skills, exertion of effort will satisfy athletes' needs for competence. Moreover, the controllable nature of self-referenced criteria used in the task-involving climate, support and promote feelings of autonomy. Sarrazin, Guillet,

and Cury (2001) explained that task-involving motivational climate affords choice and self-determined criteria for success, as well as input in decision-making, thus cultivating autonomy. This is in line with Deci and Ryan's (1985) postulation that individuals' need for autonomy will be satisfied more through intrinsically regulated behaviour, as this type of regulation is autonomous, and performed out of personal interest in the task itself. Lastly, cooperative interactions inherent in a task-involving climate are more likely to strengthen social links among the athletes (Newton, Duda, & Yin, 2001), thus nurturing the need for relatedness (Ntoumanis, 2001). Overall, task-involving climates, as it was shown from all the three present studies, promoted higher satisfaction of athletes' needs for autonomy, and competence through the self-referenced criteria of success, and promoted a higher need for relatedness with the coach through the cooperative behaviours promoted by the coach in the team.

On the other hand, in an ego-involving climate a differentiated conception of ability is endorsed, and normative criteria of success adopted, leading low ability individuals to easily doubt their competence (Ames, 1992; Duda, 2001; Nicholls, 1989). Consistent with the present results, it was shown that the uncontrollable nature of these standards of ability, in an ego-involving climate, was associated with lower levels of need satisfaction. That is, the athletes, in the present studies, felt less autonomous, less competent and less related with their coach. The comparative element and the pursuit of surpassing teammates as a contingent sense of social-worth often interfere with intimacy and relatedness (Deci & Ryan, 1995). Athletes who perceive that social acceptance is contingent on outcomes compromise their needs for relatedness and autonomy as they have no other choice but behave with regards to the required manner promoted by the group or the leader. In the present studies, the athletes' need for relatedness referred to the coach. Thus, when the coach promoted more ego-involving cues, the athletes' sense of competence might have been more compromised, if they did not manage to show superiority over their opponents or teammates; their need for relatedness with the coach more hindered, as the coach is the one who sets and encourages these cues. These athletes perceived lower satisfaction of their need for autonomy, as they were left less choice and that they had to comply more with their coach's standards of success.

As no previous research has examined the impact of athletes' self- and meta-perceptions of the coach-athlete relationship on the three needs, comparisons and

similarities were withdrawn from other studies. Social support as a dimension of coaching behaviour was found to predict the need for relatedness (Reinboth, Duda, & Ntoumanis, 2004). From a leadership perspective social support has failed to predict athletes' need for relatedness (Hollembek & Amorose, 2005). Sarason, Levine, Basham, and Sarason (1983) have defined social support as "the existence of availability of people on whom you can rely, people who let us know that they care about, value, and love us" (p. 127). In the sport setting, Chelladurai and Saleh (1978) adopting a leadership approach, referred to social support as the coach's concern for the athletes' welfare. Their definition involved helping attitudes from the coach for his/her athletes' personal problems, denoting a concern for the overall psychosocial development of the athlete; maintaining positive group atmosphere; improvement of communication and helping solve conflicts as a part of enhancing the team's cohesiveness. Social support as a broad concept refers to the help and care that significant others provide and it can be manifested in many forms, such as providing information, instrumental help, or companionship among other ways of caring (Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005). From a self-determination theory perspective, it has been suggested that whether individuals will seek or not emotional support depends on the "functional significance of such support with respect to the recipient's basic psychological needs" (Ryan et al., 2005, p. 146). That is, emotional sensitive individuals are those who provide the conditions for the satisfaction of these needs. It is suggested here, that self- and meta-perceptions of closeness within the coach-athlete relationship, bear similarities with social support in their definitions through the 3 Cs elements. The constructs of Closeness and Commitment reflect feelings of like, trust, respect, and mutual commitment in the athletic relationship as well as mutual sacrifices and accommodations of both athlete's and coach's behaviours, needs and feelings, respectively; whereas, the construct of Complementarity reflects co-operative coach-athlete transactions and being friendly and at ease in the presence of one another. Comparing these constructs with the construct of social support, the 3 Cs could reflect feelings of value (through respect) care and love (through like and mutual sacrifices) and feelings of help and support (through commitment, sacrifices, and cooperation) that are inherent in the construct of social support. Therefore, through this comparison between the social support construct and the conceptualisation of the coach-athlete relationship through the 3 Cs, it is logical to assume that the coach-athlete relationship is expected to be associated

with the need for relatedness. This is, because it nurtures feelings of trust, respect and liking between the coach and the athlete, it is more likely to satisfy athlete's need to feel related, cared for and secured within the context in which he/she operates. An athlete who feels closer to his/her coach is more likely to turn to him/her in times of need and rely on him/her, thus strengthening the relationship with the coach, and satisfying more the need to feel related to him/her.

In addition, a complementary coach-athlete relationship, involves interactions where the athlete is at ease with the coach, and is characterised by friendliness. As was shown from Study 1 in this thesis, a coach-athlete relationship and especially a highly complementary one, entails elements of a task-involving climate. A task-involving climate was found to promote athletes' need for autonomy (Ntoumanis, & Biddle, 1989; Standage et al., 2003) whereas, aspects of task-involving climate (e.g., Improvement) were found to promote needs for competence (Reinboth et al., 2004). In a complementary relational context, an athlete is expected to feel freer to be him/herself, express more personal opinions, contribute more to decision-making, and experience more feelings of choice and control. Commitment on the other hand contains a future perspective of the relationship, and a conviction that this relationship will lead to future successes, thus nurturing the athlete's need for competence in sport. Because in sport, performance accomplishments require a lot of effort and time (years of training and preparation) mutual commitment from the part of the coach is more likely to convey feelings of competence and self-worth to the athlete. Comparing the present results with results obtained from Reinboth et al.'s (2004) study where it was shown that improvement led to satisfaction of the need for competence, the present results showed that when the athletes perceived that their coaches invested more time and engaged more in sacrifices in order to help the athlete improve, the athlete's need for competence was more satisfied.

Results from the three sub-studies, also showed that need satisfaction within the social contexts of motivational climate and coach-athlete relationship influenced differently various types of motivation, perceptions of role ambiguity, satisfaction and performance. Vis-à-vis types of motivation, and according to SDT (Deci & Ryan, 1985, 2000) the satisfaction of the three intrinsic needs will facilitate self-motivation and effective functioning. This is done because need satisfaction facilitates the internalisation of existing values and regulatory processes, and facilitates adjustment.

Need satisfaction therefore, leads to human growth and development (Deci & Ryan, 2000). Participation in sport for some athletes can be due to their need to feel competent, and the need to relate to other people, not necessarily only other athletes of the same age, but older adults such as the coach (Weiss & Petlichkoff, 1989). When athletes function in an-ego-involving climate they strive to attain social approval from their coach and external rewards, whereas the demonstration of their ability takes control of their behaviour (Nicholls, 1989). In case these athletes do not satisfy their need for social approval from their coach and their need to show superior competence, are less likely to find inherent satisfaction in their sport, and in the process of engaging and learning.

Results also indicated that need satisfaction differentially predicted extrinsic types of athletes' regulation. Specifically, identified regulation was positively predicted by the needs suggesting that university athletes might participate in university sports for reasons that are extrinsic, such as to improve their skills, improve other aspects of themselves, or even meet people, but these reasons are still well integrated into their selves. Thus, this positive link between need satisfaction and identified regulations is consistent with Deci and Ryan's SDT and previous research (Ntoumanis, 2001). It might be the case though, that some athletes perceive less satisfaction of these needs, and specifically less satisfaction in certain needs-although in the present study the three needs were not examined separately. In that case these athletes are more likely to be extrinsically motivated to continue to participate. They might be forced by guilt or forced by their teammates to continue to participate, or in ego-climates, they might participate to win the cup, thus not deriving any pleasure from the mere participation in their sport. When athletes' needs are not satisfied at all, then these athletes will feel amotivated. When they feel incompetent, controlled by their coach and that they cannot relate to their coach then neither intrinsic nor extrinsic reasons are provided for their participation in sport. These athletes are more likely to withdraw.

The consequences of these findings are important for the athletes' integrative processes as integration concerns the regulation of behaviour by the self (Ryan, 1995). In the context of sport, where the competition and normative evaluative criteria are salient, the social-contextual conditions in the athletes' immediate environment influence athletes' integrative processes. In this immediate environment the coaches are a key factor to the promotion of more integrated types of motivational regulation.

By structuring effective coach-athlete relationships and a climate conducive to learning and athlete's improvement, coaches set the social and contextual conditions through which athletes' needs will be satisfied and athletes' intrinsic motivation will be promoted. The satisfaction of athletes' needs will enhance their intrinsic motivation to practice their sport, which is a very important element especially in high levels of participation. In these levels, a substantial amount of time and energy, as well as commitment are required from the athlete to keep on going and achieve excellence. On the other hand, athletes who are only extrinsically regulated are more likely to drop out and experience higher levels of boredom (Ntoumanis, 2001), lower levels of enjoyment, put less effort (Ntoumanis, 2002), and report less intention to continue participating in their sport (Standage et al., 2004).

Although, the present study did not examine associations between other elements of the social environment, such as the influence of parents or managers on the athletes' need satisfaction or cognitive, affective or behavioural responses, results from other studies indicated that coaches are key elements and targets in intervention programmes (Smith & Smoll, 1990; 1996; Smoll & Smith, 2003) Coaches, who realise the importance of the motivational orientations that they promote in their team, and the importance of the relationships they establish with their players, will be more willing to put effort into creating more conducive, to the players' well-being and performance, climates and relationships. Through a plethora of coach educational programmes (e.g., Sports Coach) certificates, information available on the internet, coaches could learn which are the best methods and techniques available for internally motivating their athletes. Coaches who are able to provide positive and rewarding feedback instead of punishment will have more competent and autonomous athletes. Coaches who can communicate effectively with their athletes, resolving conflict with them, accepting them, and providing support, are more likely to build effective relationships with them and thus satisfy more the athletes need for relatedness and care, and facilitate their need for autonomy, since athletes might feel more comfortable voicing their views within certain limits. Martens (2004) suggested that listening to the players demonstrates respect, builds relationships, and enhances loyalty.

With regards to need satisfaction and various cognitive, affective and behavioural outcomes, results confirmed the hypotheses of Study 3b and 3c. As it was shown from

all three studies, in such task-involving contexts and effective coach-athlete relationships, roles were conveyed and received clearly, and athletes felt more satisfied and performed better, while athletes' needs and athletes' responses were thwarted in ego-involving motivational climates and low 3 Cs relationships. These results support the SDT tenets on the mediating role of the needs in the relationship between social contexts and optimal functioning and well-being. Previous research in the organisational domain, relative to need satisfaction's influence on facets of subjective performance, showed that it positively related to work performance and job satisfaction (Baard, Deci, & Ryan, 2004; Deci, Connell, & Ryan, 1989). In the sport domain, and more specifically in a task-involving climate, autonomy needs have been found to promote feelings of intrinsic satisfaction (Reinboth et al., 2004). It seems that athletes who feel competent in the presence of their coach, and feel that their coach conduces to their having control over their overall sporting experience, feel more satisfied with their treatment from their coach, are more intrinsically motivated to participate in their sport, to put more effort to learn new skills and techniques, to improve their performance. These athletes perform better and are more satisfied with their performance and their competitive results, because their criteria of success do not depend on win/loss records, but on the process of performing.

Once more, it is shown that coach is a major contributor to the athletes' well-being and psychosocial development. Coaches, who are competent in providing the necessary conditions for their athletes need satisfaction, will have more successful and happy athletes. Open channels of communication that are built through effective relationships and communication skills seem to be an essential tool for the coach. Furthermore, a coach that recognises that male and female athletes communicate in a different way holds even greater potentials to achieve success. Tannen (1990) explains that women might downplay their expertise in a verbal communication, which may appear as lack of confidence or competence on their part, because they do not want to appear boastful. More specifically, men use conversation in order to negotiate their status within a group/team and preserve their independence. Females on the other hand, use conversation to negotiate closeness and intimacy (Tannen, 1990). Coaches' communication skills lie in listening carefully and distinguishing effectively between female athletes' words. Good and effective communication and more importantly clear communication of the coach's expectation for the athlete's roles will result in

more competent athletes, who trust and respect their coaches, and understand their roles clearly, perform better, and are more satisfied. For coaches of female athletes, conversation can be used to create feelings of closeness, thus enhancing the coach-athlete relationship and satisfying the athletes' need for relatedness. Other skills essential for non-verbal communication, that can help the coach establish good and effective relationships and satisfy athletes' needs, are speaking clearly and concisely, giving and receiving feedback and criticism, choosing the right words, and resolving conflict effectively (Werthner, 2001).

Methodologically, the models tested via SEM within the three sub-studies, generally provided acceptable fit to the data, supporting the integration of the aforementioned theories. The variance explained in the outcome and mediating variables was low to moderate. Although SEM is a sophisticated and powerful technique and the only one until now to test models as past of theory it also contains certain limitations.

An inherent limitation of the SEM analysis is that its focus is on the model fit, and not on the relationship between two variables. It should be also noted that a great weakness in structural equation modeling "lies in excluding key variables that may influence the system. When important control or causal variables are omitted from a model, the parameter estimates of the model will be biased and misleading conclusions can be drawn from an analysis" (Bentler & Chou, 1987, p.97). To overcome this issue of not accounting for the variables that are not included in a model is to simply add other plausible causal variables. But each variable inclusion yields a larger and more complicated model that is more difficult to fit to a set of data. Thus, "one can only do one's best" (Bentler & Chou, 1987, p.97) and guided by the theory and balancing the practicalities with theory, construct an adequate explanatory model that is within the analytic power of SEM. In the present study, one would be tempted to add more explanatory variables in terms of social cohesion, individual and situational factors, as well as more mediating variables but this would only yield a large and unrealistically complicated model to run with the power of the existing software.

The current studies add to previous investigations of SDT, AGT, and Coach-athlete relationship, in the sport domain by considering the need satisfaction in relation to types of motivation, role ambiguity, performance and satisfaction. The fact that the composite score of need satisfaction predicted these variables supports the need theory

(Ryan & Deci, 2000) and suggests that is indeed useful to continue using the concept of need satisfaction in research in achievement goal theory and coach-athlete relationships contexts. It would be also important and further informative to specify separately the needs been addressed. Ryan and Deci (2000) stated that “relatedness is important for intrinsic motivation, although with some tasks and some circumstances, a distal sense of relatedness is all that is required” (p.334). This is true, especially in relationships between male coaches and female athletes. Potential for sexual harassment is inherent in sport. Plaisted (1995) noted that dominance and exertion of power over athletes are emphasised in sport, a traditionally dominate field, and thus sport may become a fertile breeding ground for the demonstration of male power over women, especially given the high levels of trust involved in the coach-athlete relationship. The author describes sexual harassment in sport as “and unwanted, unwelcome, unreciprocated and repeated sexual attention and involves an abuse of power” (Plaisted, 1995, p. 557). Several Sports Federations have announced guidelines for equal treatment in the training sessions, in order to protect both coaches and athletes. The majority of the guidelines concur that romantic and/or sexual relationships between coaches and athletes compromise the professional integrity of the coach and educational mission of the sport. Irrespective of athletes’ age their voluntary consent is suspect because of the unequal nature of the coach-athlete relationship. Even more important is the relationship between a coach and a very young athlete. Everything a coach says and does has a profound impact on the athlete and leaves lasting impressions. Coaches at that age may act as role models and the relationships they establish with their athletes may become models of future relationships. When a coach is becoming romantically involved with a young athlete he/she violates not only the coach-athlete bond but also the law. In such circumstances the athlete might face long lasting emotional and physical harm

Thus, the focus on need satisfaction can provide a framework for empirical exploration of the contextual factors that allow/forestall need satisfaction and in turn facilitate/impede intrinsic motivation, and optimal functioning. Like previous studies, exploring constructs and tenets proposed by AGT, SDT, and Coach-Athlete relationship frameworks, the present studies indicated that the social environment involving the coach and the athlete is extremely important for the athlete’s integrity, psychological growth, optimal functioning, and consequently for well-being. These

studies show in particular, that the concept of need satisfaction can provide a useful means by which contextual factors relate to motivation and cognitive, affective and behavioural outcomes. What remains to be explored is the extent to which the influence of contextual factors contributes over and beyond dispositional characteristics and orientations in the satisfaction of each of the psychological needs separately and predicts other outcomes across time.

Given the infancy of this line of inquiry, there is a plethora of research topics and variables that could be investigated at conceptual, methodological, developmental, and practical levels. For example, future research should incorporate the role of other significant people from the athlete's social network, influencing basic needs and in turn various outcomes. Ntoumanis and Vazou (2005) argued that the impact of the peers in promoting certain motivational cues and in shaping the motivational climate has not received much attention in AGT, even though Smith (2003) emphasised how peer relationships could contribute to the quality of physical activity experiences. Parents' contribution to the development of the motivational climate and in relation to other correlate variables has only the last years begun to be investigated (White, 1998; White & Duda, 1993; White, Duda, & Hart, 1992; White, Kavussanu, & Guest, 1998). Athletes' relationship with their parents plays a significant role in the quality of experiences in sport as well. Vallerand in his commentary towards Ryan and Deci's (2000) "The darker and brighter sides of human existence: Basic needs as a unifying concept" argued that when needs are not satisfied people tend to turn elsewhere to satisfy them. In the same line of reasoning, it is argued here that athletes that do not satisfy their basic needs in the relationship with their coach turn to alternative sources of need satisfaction, such as peer relationships, or relationship with their parents. Especially, in large size teams, where the coach has less opportunities and time to liaise and relate with each individual athlete, athletes tend to approach their teammates and through their relationship with them satisfy their need for relatedness. Ryan, Stiller, and Lynch (1994) attest to that, by highlighting the importance of a network of supportive relationships for the facilitation of an individual's motivation and relative achievement. People in that sense, are happy to deploy their talents to best advantage when experienced trusted others are standing behind them (Bowlby, 1973). Thus, it would be interesting to explore to which degree various significant others contribute to need satisfaction from different aspects of the social environment, (e.g., relationship

context, motivational climate). It might as well be noteworthy to study the role of the individual differences in the strength of needs in the satisfaction of the needs. It would also be interesting to examine the degree to which satisfaction of all of the three needs is required and the importance athletes attach to the satisfaction of each one separately. This study was also the first to address the issue of self- and meta-perceptions of the coach-athlete relationship as predictors of need satisfaction. In addition, no previous studies have examined the influence of need satisfaction on dimensions of satisfaction and role ambiguity.

A methodological future recommendation involves dyadic analysis incorporating the coach's perspective on the coach-athlete relationship and motivational climate, as a comparison of athletes' and coaches' perspective will shed some new light on their shared views. How much they understand each other? And what do they think of each other? Or how much these perceptions affect the gratification of their needs? A very interesting point to make here is that coach's needs should be taken into consideration as well, according to Jowett and colleagues' (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Meek, 2000a; Jowett & Ntoumanis, 2004) definition of the coach-athlete relationship that includes both coaches and athletes' cognitions, emotions and behaviours. Coaches who through their relationship with their athlete meet their psychological needs are more likely to be satisfied and do their job better, producing better results.

Need satisfaction and integration of the regulation of behaviour are ongoing processes that are influenced by perceptions of the social-contextual conditions and provide the necessary conditions for growth, health, and integrity (Ryan, 1995). Previous research has demonstrated that daily fluctuations in the satisfaction of autonomy, relatedness, and competence needs predicted within-person fluctuations in participants' mood, vitality, physical symptoms, and self-esteem (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon, Reis, & Ryan, 1996). Another methodological future direction would be to study longitudinally need satisfaction and examine the impact of the social context at crucial time points, and on further outcomes such as satisfaction and well being as well as athletes' regulatory styles. An intervention program would shed further light on the causes and effects between need satisfaction and other variables.

The three needs for autonomy, competence and relatedness can be used separately in future studies in structural equation models, so that the contribution of each one of

them in predicting indices of motivation can be identified. In the same vein, the contribution of the social context in the prediction of each need would be clearer. In the present study due to its exploratory nature and the type of research question, a single factor, representing need satisfaction was used, as in La Guardia, Ryan, Couchman, and Deci's (2000) study.

As noted earlier perceptions of competence are common in both AGT and SDT. A basic difference is the further distinction of the concept of competence as self- and other-referenced in achievement goal theory. Future studies that wish to integrate the two theories in examining the satisfaction of the needs should incorporate this concept of competence and utilise an instrument that measures the two differentiated conceptions of ability. An example of such an instrument is the Conceptions of Perceived Ability (PH-C) that was developed by Nicholls (1989) and that has been utilised by Boixados et al. (2004) and Roberts and Ommundsen (1996). All the above findings and recommendations conduce to the argument that a better understanding of cognition about interpersonal dynamics could help to integrate the various domains of relationship research.

CHAPTER 6

GENERAL DISCUSSION

6 General Discussion

This chapter begins by summarising and reflecting on the main findings of each study with a focus on the “big” picture; this is followed by a discussion which synthesises the results from the separate studies in a coherent framework. A brief summary of each study is introduced first, followed by an integration of all the findings. Strengths and limitations of the thesis are presented and on this basis recommendations for further research are suggested. The chapter concludes with practical implications.

6.1 Introduction

The main focus of this thesis has concentrated on investigating the link between social contextual factors that constitute the motivational and relational environment surrounding the coach and the athlete. In Chapter II, Literature Review, the main tenets of achievement goal theory (Nicholls, 1989) were presented along with the conceptualisation of the coach-athlete relationship by the 3+1 Cs (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004). An overview and critique of the current literature followed, indicating certain gaps in the research and identifying how these two areas of sport psychology could be integrated for a better understanding of the field. Previous research has shown that perceptions of the motivational climate created by the coach were strongly linked with athletes' perceptions of the behaviours exhibited by the coach and ratings of the coach (Balaguer, et al., 2002; Balaguer et al., 1999; Chaumeton & Duda, 1988), thus leading to an integration of achievement goal theory (Ames, 1992; Nicholls, 1989) and leadership tenets (Chelladurai, 1990; Smoll & Smith, 1989). Thus, empirical evidence led to the development of an integrated model of leadership and motivation (Duda & Balaguer, 1999).

Specifically, Duda and Balaguer's (1999) model of leadership and motivation was presented as a model that researchers can use to explore how contextual factors, such as the motivational climate and the coach behaviours from a leadership perspective, can influence athletes' cognitive, affective and behavioural responses. Critical outline of this model focused on the inability of the leadership approach to capture the intricacies of the coach-athlete relationship. An integration of achievement goal theory and the recent conceptualisation of the coach-athlete relationship in terms of the 3+1

Cs was proposed in order to help in better understanding the social contextual factors influencing the athletic experience (see Figure 2).

As was argued in the literature review, the adoption of a leadership perspective is valuable, but in many ways limited, if one wishes to capture the coach-athlete dynamics, because it neglects important and central elements of the relationship established between the athlete and the coach in the sport context. The neglect of a relationship perspective in the study of social contexts and social relationships within the sport domain is surprising given the fact that coaching is not something that the coach does to the athletes and it cannot be observed solely through coach's behaviour (Jowett, 2005), as it was attempted until recently (e.g., Salminen & Liukkonen, 1996); it should involve the athlete's contribution as well and consider both the athlete's and the coach's perspectives. As Jowett and Chaundy (2004) argued, leadership is a function that is shared between the coach and the athlete. Coaches cannot lead alone. They need the athletes in order to convey to them their expertise and the athletes need their coaches to help them advance their skills. Therefore a coach-athlete relationship perspective is better equipped to provide information relevant to the "sharing" coaching process. The coach-athlete relationship can account for the mutual interdependence that exists between the coach and the athlete. This thesis' focal aim concentrated on the investigation of athletes' perceptions of the social environment within the context of team sports.

Thus, the research undertaken in the present thesis began as an attempt to fill what it was assumed to be an interesting empirical void in the sport literature. This thesis took a different perspective and a more holistic approach to the coach-athlete dynamics from a relationship angle. The social environment was examined in terms of athletes' perceptions and it was the one represented by the most significant and central figure of athletes' sporting life - the coach. Two different facets of the social environment were investigated through the adoption of two different theoretical approaches and frameworks/conceptualisations. Specifically, (1) athletes' perceptions of the situational goal structure or motivational climate emphasised by the coach, as conceptualised by achievement goal theory (Ames, 1992; Duda, 2001; Nicholls, 1989), were explored in relation to (2) athletes' perceptions of the coach-athlete relationship, as conceptualised in terms of the 3+1Cs conceptualisation (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004, Jowett et al., in press).

Particularly, the recently introduced 3+1 Cs conceptualisation and operationalisation of the athletic relationship that is developed between the coach and the athlete (Jowett, 2005; Jowett & Cockerill, 2002; Jowett & Ntoumanis, 2004) was adopted and examined relative to athletes' perceptions of the motivational climate. The greatest strength of this approach and its greatest contribution to the body of knowledge thus far, is that it considers the cognitive and affective elements that were not included in the leadership approach, and in this way it adds to the complexity of the coach-athlete interpersonal interactions, involving as well behavioural elements embedded in the coach-athlete relationship in an interdependent fashion, as they are experienced by both the coach and the athlete.

To these ends, and in order to provide a more holistic perspective of the social-contextual sporting environment, three studies were undertaken. The first study investigated the interconnection between athletes' perceptions of the motivational climate and the coach-athlete relationship in a group of team sport performers at one point in time. The second repeated this, except across an academic season rather than at a single time. The third study explored the manner in which these two contexts impacted on several outcome variables through the mediating mechanism of psychological needs, or more specifically, the way that perceptions of the motivational climate and the coach-athlete relationship influenced athletes' motivation, role ambiguity, satisfaction, and performance through the mediating mechanism of need satisfaction.

6.2 Summary of Findings

6.2.1 Study 1

The main aim of the first study was to examine how the elements of the coach-athlete relationship link with the features of the task- and ego-involving climate. Two secondary aims included: a) validation of the CART-Q in a sample of British athletes participating in team sports, b) testing for gender differences in athletes' perceptions of the contextual factors.

Results from the secondary aims are presented first followed by the main results of the first study, as the discussion will focus on the latter. As the recently developed CART-Q is in its infancy, the first study also provided further psychometric evidence for the

factorial structure of both the self- and meta-perception versions. Confirmatory factor analysis showed that the a priori second-order three-factor factor model fits the data well. Overall, the results demonstrated that the CART-Q possessed factorial validity and reliability as a measure of the coach-athlete relationship for a sample comprising team sport performers. Additionally, gender differences were detected in athletes' perceptions of the coach-athlete relationship and the motivational climate. Males were shown to hold stronger perceptions of an ego-involving motivational climate, which is in agreement with previous research findings (e.g., Kavussanu & Roberts, 1996), and females were shown to hold stronger task-involving climate perceptions. Contrary to expectations and limited research (Jowett & Don Carolis, 2003), males in the present study were shown to view the relationship with their coach as more close, committed and complementary (both on part of themselves and on part of their coach) than females.

With regards to the main aim of the study, research guided by achievement goal theory has in its entirety focused on a macro-level of analysis of the motivational climate, in the sense that it only addressed the two major (global) types of task- and ego-involving goals emphasised by the coach. The present research took a different approach by adopting a "micro-level of analysis". That is, the sub-dimensions underlying the task- and ego-involving climates according to Ames (1992) and operationalised by Newton et al. (2000) were closely studied and analysed. Although all the previous studies have provided information for the effects of the task- and ego-involving motivational climate in general, the present study sought to provide information on the individual contribution of each underlying feature of the task-involving (i.e., cooperative learning, effort/improvement, important role) and ego-involving motivational climates (i.e., punishment for mistakes, unequal recognition, intra-team rivalry). In a similar vein, although the coach-athlete relationship has been conceptualised and operationalised in a hierarchical way, the underlying first-order dimensions (i.e., closeness, commitment, and complementarity) were examined in this study relative to the motivational climate's first-order dimensions. By adopting such an approach, it was assumed that more detailed information would be provided on the possible associations between elements contained in the motivational climate and the coach-athlete relationship, and will contribute to the creation of a more comprehensive picture of the atmosphere in the team.

Thus, in an exploratory fashion, the first study sought to investigate which features of the athletes' perceptions of the motivational climate and which elements of the coach-athlete relationship were linked together and in what way. Canonical correlation analysis was employed to test how the two sets of sub-dimensions (i.e., the 3 Cs of the coach-athlete relationship and the several aspects of the motivational climate) related to each other. Results revealed that all of the elements of the coach-athlete relationship were highly and positively correlated with all of the subscales of the task-involving climate. That is, athletes who perceived higher levels of closeness, commitment, complementarity towards their coach, and perceived that their coach held mutual perceptions on the same elements towards them, also perceived higher levels of cooperation within their team, a stronger learning and mastery orientation reinforced by their coach, a greater emphasis on effort as means of improvement and recognition of everyone's role in the team as important and crucial. This finding is consistent with the postulates of achievement goal theory (Ames, 1992; Duda, 2001; Nicholls, 1989) and recent research findings that perceptions of a task-involving climate were linked with more positive views about coach leadership (Balaguer et al., 2000; Balaguer et al., 1999), more social support and positive, and encouraging and informational feedback (Amorose & Horn, 2003; Smith et al., 2005). An additional point in this finding is that all of the 3 Cs correlated highly with all of the task-involving subscales. The importance of this result lies in the fact that closeness and commitment, namely the affective and cognitive elements of the coach-athlete relationship, are important when we take into consideration the social factors in sport. These two elements through their high correlations with the task-involving climate progress the research conducted to investigate coaches' behaviours and motivational climate (Balaguer, et al., 2002; Balaguer, et al., 1999; Smith et al., 2005). This finding supports the initial aim of the first study, that all 3 Cs be used to operationalise and measure the coach-athlete relationship are equally important and correlate equally strongly with perceptions of the motivational climate. In addition, all the elements of the coach-athlete relationship moderately and negatively correlated with the subscales of ego-involving climate, providing further support with the aforementioned theory and research. Lower levels in all the 3 Cs were associated with a more ego-involving atmosphere in the team which was found to associate with less positive and adaptive athletes' responses (Duda, 2001; Duda & Hall, 2001).

It is worth mentioning at this point that the elements of the coach-athlete relationship correlated *more* with the task- than the ego-involving features of the motivational climate. As the CART-Q was initially developed to measure the positive aspects of the coach-athlete relationship, it shares more variance with a task-involving motivational climate that includes positive features, (e.g., cooperative learning) than with an ego-involving one. It is assumed that since an ego-involving climate contains negative features of the environment initiated by the coach (as previous research has shown through the positive associations with maladaptive outcomes), such as punishment and unequal recognition as well as intra-team rivalry, it would be more closely related to negative aspects of the coach-athlete relationship. If the CART-Q included dimensions that indicated and measured conflict and rivalry in the coach-athlete relationship, it would be expected that these scales would highly correlate with the ego-involving climate subscales. In a highly argumentative coach-athlete relationship, athletes and coaches are characterised by distrust, disrespect, lack of commitment, and lack of co-operative interactions during their training sessions. Although, the CART-Q captures lack of commitment and complementarity, it does not capture distrust and disrespect. In such a climate, athletes are more likely to perceive that the coach promotes rivalry; due to lack of trust and respect athletes would always be suspicious about the fairness of the coach towards all the players in the team, perceiving that the coach pays attention only to the best players. Due to the lack of closeness and commitment with the coach, athletes would perceive that the coach promotes intra-team-member rivalry, because the coach-athlete relationship will act as a model on which athletes build relationships with their peers. Finally, when athletes perceive less complementarity and commitment in the coach-athlete relationship, they perceive that the coach downplays the importance of their relationship not paying attention to the future development of the athlete, and thus not promoting effort and improvement. Consequently, in such a context it is expected that coaches promote more ego-involving cues in the sense that mistakes will not be viewed as part of learning; athletes will be punished after their mistakes in order not to repeat them but not in order to learn. Jowett (2001) has recommended the extension and development of a CART-Q measuring the negative aspects of the coach-athlete relationship elements: negative closeness, lack of commitment and negative complementarity. Taking this argument further, one can assume from the present findings that an effective coach-athlete relationship as it is measured by the CART-Q (i.e., high levels of closeness,

commitment and complementarity) contains more task- than ego involving characteristics.

Another significant finding from the canonical correlational analysis was the strength of prediction in terms of the variance that the one set of constructs explained in the other one. The motivational climate's features were shown to explain more variance in the elements of the coach-athlete relationship, self- and meta-perceptions of closeness, commitment and complementarity than did the elements of the coach-athlete relationship in the task and ego's sub-dimensions. Although, no direct predictions can be made, given that no previous theoretical and empirical evidence has ever documented the relationship between the two constructs and its direction, the fact that the motivational climate predicted more variance in the coach athlete relationship is certainly significant, lending credence to the fact that coach-athlete relationships can be conceptualised in terms of their task- and ego-involving features. Once the link between the two constructs had been established, the next step in this thesis was to track these perceptions and their interconnections across time.

6.2.2 Study 2

Although there exist a few studies in the physical education and sport domain which focus on assessing the effects of short- or long-term interventions on athletes' perceptions of the motivational climate (e.g., Digelidis, Papaioannou, Laparidis, & Christodoulidis, 2003), no published research has to the author's knowledge provided information on how (and if) athletes *naturally and progressively* change their perceptions of the motivational climate and the coach-athlete relationship with the passage of time. Interventions provide invaluable information and are urgently warranted, as they constitute the main aim and end result of any theory and research and show how a particular concept progresses naturally over time. Due to experimental difficulties in the design and conduct of such research not many intervention studies are reported. Furthermore, longitudinal methods and designs are easier to design and conduct than interventions, yet still more difficult than cross-sectional designs; they also permit the systematic study of stability and the developmental change over time and can provide information on whether the course of change differs with characteristics such as gender, level of participation, time that the athlete and the coach have spent together practicing, etc.

To address this lack of longitudinal research in the sport psychology literature, the second study adopted a longitudinal design which aimed at unveiling the interrelations between athletes' perceptions of the motivational climate and the coach-athlete relationship across a 9-month academic sports season. More specifically, the present study was the first one to measure, monitor, and document athletes' perceptions of their team's situational goal structure and their self- and meta-perceptions of the relationship they formed with their coach at the beginning, middle and end of a nine-month academic season, and report their growth trajectories. Three broad and interrelated, but distinct, questions guided the research design. Firstly, did athletes' perceptions of the motivational climate and the coach-athlete relationship change over time, and if so, was there uniformity/individual variability among athletes in the rate of change? Secondly, if these perceptions changed, could known characteristics explain some variation in change? And lastly, how did perceptions of the motivational climate change in relation to perceptions of the coach-athlete relationship?

These changes in the two different aspects of the environment were investigated firstly in isolation, in the second stage along with correlates (e.g., gender and time spent training current with coach), and in the third stage together. Specifically, in the third stage, it was tested whether earlier levels on one construct could predict later developmental change on the other construct; whether initial levels of athletes' perceptions of the motivational climate could predict later change in their perceptions of the coach-athlete relationship over time; and whether initial levels of athletes' perceptions of the coach-athlete relationship could predict later change in their perceptions of the motivational climate. Latent growth modeling technique was employed to analyse the data, firstly because it is capable of describing change as a *continuous process*, and secondly because it allows trends to be modelled on both how the whole sample as a *group* changes and how *individuals* change.

Results from latent growth modelling indicated that athletes' perceptions of certain elements of the coach-athlete relationship changed, whereas others remained stable. With regards to the elements that changed and in terms of the coach-athlete relationship, results showed that athletes' self-perceptions of closeness, commitment and complementarity decreased, as well as their meta-perceptions of complementarity. Similarly, in terms of athletes' perceptions of the motivational climate, results showed that cooperative learning and effort/improvement decreased, whereas unequal

recognition increased. With regards to the elements that remained stable and in terms of coach-athlete relationship, results showed that meta-perceptions of closeness and commitment did not show any change; and in terms of the motivational climate, important role and punishment for mistakes also remained stable.

The changes in coach-athlete relationship and motivational climate perceptions were significant but minimal, resulting in a similar pattern of perceptions at the end of the nine-month academic season; athletes still perceived high levels of self- and meta-closeness, commitment and complementarity; they also perceived high levels of cooperative learning, effort/improvement, and important role, while moderate levels of punishment for mistakes and unequal recognition. Further, results also showed that athletes' initial scores on self-perceptions of closeness, commitment, complementarity and meta-perceptions of complementarity predicted later change in unequal recognition. Athletes who perceived a more effective coach-athlete relationship (in terms of higher levels of self and meta-closeness, commitment and complementarity) at the onset of the season experienced less steep increases in their perceptions of their coach recognising some athletes more than the others.

In conclusion, the first two studies indicated that elements of the motivational climate were closely linked with certain elements of the coach-athlete relationship cross-sectionally, and that they also changed together across a nine-month period. Furthermore, it was shown that the self-perceptions of the coach-athlete relationship and some of the meta-perceptions of complementarity could predict changes in unequal recognition, although prediction does not necessarily infer causation. Although, this analysis models directional impact from one variable to the other, it does not necessarily establish that this relation is causal (Bollen, 1989). Therefore, having established how motivational climate and coach-athlete relationship are related in and across time, the next step was to test how these constructs predict several outcomes.

6.2.3 Study 3

Drawing from Duda and Balaguer's (1999) model of proposed links between motivational climate, coach leadership behaviours, and individual and team's cognitive, affective, and behavioural responses, the third study sought to examine the associations between athletes' perceptions of situational factors and several important

outcome variables. Although previous research has provided some insight on the impact of motivational climate on different outcomes, the mechanisms that might be involved are less clear. Limited research exists on the influence of the coach-athlete relationship on outcome variables, which is restricted to its influence on athletes' satisfaction and team cohesion. However, no empirical evidence exists regarding the mechanisms involved in the process of influence. On the basis of this line of argument, this study attempted to integrate achievement goal theory and the conceptualisation of the 3+1 Cs with Self-determination theory (Deci & Ryan, 1985, 2000). Specifically, a sub-theory within the big SDT framework, the Needs Theory (Ryan & Deci, 2000), was adopted due to its capability to suggest how social contexts impact on athletes' motivational regulations and well-being. In particular, the present study examined the mechanisms through which perceptions of the motivational climate and the coach-athlete relationship affect motivation, role ambiguity (cognitive), satisfaction (affective), and performance (behavioural motivational patterns) at a group and individual level.

Study 3A investigated Deci and Ryan's (1985, 2000) proposition that contextual factors such as the coach-athlete relationship and the motivational climate, predict different types of *motivational regulations* through the satisfaction of the athletes' basic psychological needs of autonomy, competence and relatedness. Athletes' perceptions of the contextual factors that were positively associated with their satisfaction of their needs, namely perceptions of task-involving climates and effective coach-athlete relationships, were found to positively associate with self-determined motivation and negatively with amotivation.

Study 3B, concentrating on the link between perceptions of the motivational climate and cognitive perceptions proposed by Duda and Balaguer (1999), examined the associations between the motivational climate and the coach-athlete relationship as they were perceived by the athletes and perceptions of *role ambiguity/clarity*, through the mediating mechanism of need satisfaction. Following a similar pattern, athletes' perceptions of the contextual factors that were positively linked with need satisfaction, namely perceptions of task-involving climates and effective coach-athlete relationships, were found to positively associate with athletes' perceptions of role clarity.

Study 3C examined the proposed link between motivational climate and coach-athlete relationship with affective and behavioural outcomes, through the mechanism of need satisfaction. Affective patterns were investigated through athletes' *satisfaction with personal treatment* and satisfaction with performance at *an individual and team level*. *Performance* represented the behavioural component; although it was not objectively measured due to the diversity of the sports involved, athletes' subjective judgments on the tactical, strategical, and flow aspects of their performance were explored as a function of the need satisfaction by the motivational climate and the coach-athlete relationship. Structural equation modelling results revealed that satisfaction of the three needs by athletes' self- and meta-perceptions of the coach-athlete relationship explained more variance in satisfaction with personal treatment, and less variance in satisfaction with individual and team performance, and with subjective performance. Satisfaction of the psychological needs by perceptions of the motivational climate also explained more variance in satisfaction with personal treatment, and less variance in satisfaction with individual and team performance, and with subjective performance. Results also revealed that perceptions of the coach-athlete relationship were able to predict more variance in the need satisfaction and the subsequent outcomes than perceptions of task- and ego-involving climate. Considering the nature of the needs investigated in the present study, one is inclined to suggest that because they were specifically relationship needs, perceptions of the coach-athlete relationship would be more closely related to their satisfaction than the motivational climate.

Collectively, the findings from studies 3A, 3B, and 3C indicated that the coach is very important in the athletes' need satisfaction through the climate and the relationships that he/she establishes with the athletes. Because coaches and athletes spent a considerable amount of time in the presence of one another, whether the athletes feel competent as athletes, feel cared for, and achieve a sense of autonomy and control in the presence of their coach, will depend on the quality (whether all 3 Cs are present) and quantity (levels of the 3 Cs) of relationship they form, as well as on the motivational cues promoted by the coach. Their subsequent motivation will be more intrinsic and the athletes will be able to participate for the mere enjoyment of the sport and out of love for it depending on the level of need satisfaction. From an achievement goal perspective, results showed that only task-involving motivational climates that promote learning and effort are conducive to need satisfaction and

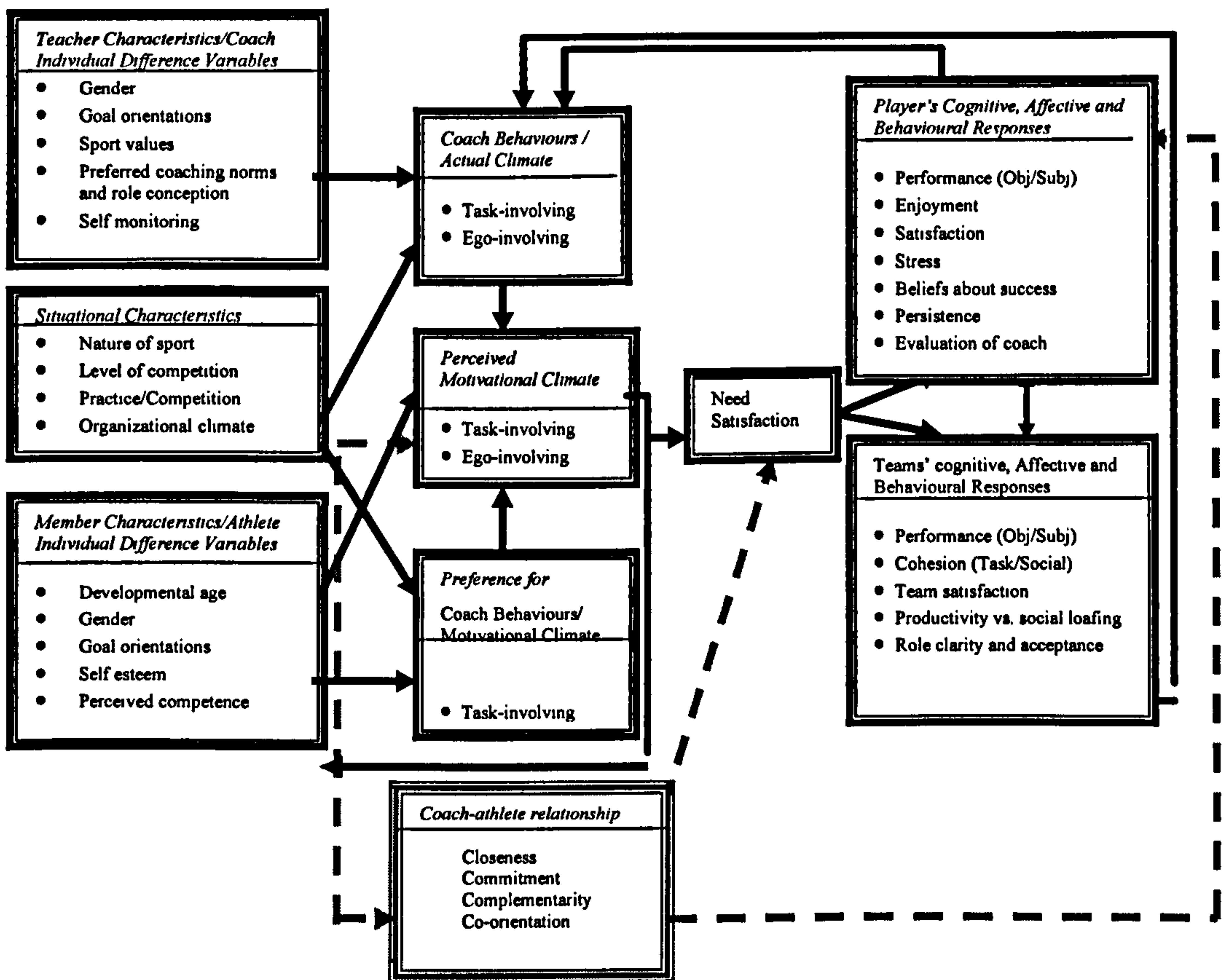
intrinsic types of motivation. From a social relational perspective, results showed that coach-athlete relationships higher in 3 Cs promote learning and effort, and are more conducive to need satisfaction and intrinsic types of motivation. In addition, athletes' need satisfaction in such contexts promoted athletes' role clarity, individual and team performance, satisfaction with performance, and satisfaction with personal treatment from the coach. These results are very important because they verify the SDT tenets (Deci & Ryan, 1985, 2000). The impact of social contexts on athletes' sporting experience is a key determinant of the quality of this experience. Athletes' optimal functioning, well-being, and internalisation process depend on whether the coach provides the necessary nutrients for the satisfaction of the athletes' needs through the climate and the relationship that he/she establishes with the athletes and the team. Thus, coaches who care about the psychosocial development of their athletes and who wish to have happy and successful athletes who participate in sport out of the love for it need to establish effective coach-athlete relationships and promote task-involving cues in the training process.

Summarising, the first study established the foundation for this thesis by identifying associations among the elements of the two contextual factors of the motivational climate and the coach-athlete relationship at one point in time. The second study informed the first study by delineating the pattern of change of these elements and their associations across time. The third study, through the three sub-studies, tested certain associations proposed by Duda and Balaguer (1999) by identifying the influence of athletes' perceptions of the motivational climate and the coach-athlete relationship on several outcomes proposed by the model. Motivation was selected due to its importance for the athletes' internalisation process. Satisfaction was selected due to its importance for the athlete's well being. Performance was selected because it is the end product of the athletic participation. Lastly, role ambiguity was selected due to its significance for the athlete's optimal functioning. It was suggested that all these outcome variables are linked with the overall quality of the athletic experience. The hypotheses regarding the influence of the situational factors on the various outcomes were confirmed, thus providing empirical evidence for the proposed associations in Duda and Balaguer's model and for the inclusion of the coach-athlete relationship as an important factor contributing to a better understanding of the impact of the context on athletes' responses. In addition, the third study extended the model even more by

attempting to explain the mechanisms by which the proposed situational factors affected various outcomes. To that end, the SDT framework was employed, in terms of athletes' need satisfaction, to operate as the mediating mechanism in these links. Study 3 confirmed the mediation of need satisfaction in all proposed links between social factors and outcomes.

This thesis provided strong evidence for the support of the proposed integrated model of motivation and coach-athlete relationships (see Figure 47.)

Figure 47: Extended model of motivation and coach-athlete relationship



The following discussion focuses on general points regarding the findings from the series of the three studies. Specifically, the utility of the mini theory of need satisfaction as a mechanism explaining the relationship between the contextual factors and various outcomes is highlighted. In addition, the implications for practice are outlined and recommendations for future research are proposed.

6.3 The Significance of the Link between Perceptions of the Motivational Climate and the Coach-Athlete Relationship

Gender differences. Associations between perceptions of the motivational climate and the coach-athlete relationship were observed in both male and female athletes and these associations followed a similar pattern. Although male athletes in the first study reported higher levels of perceived ego-involving climate, which is consistent with previous achievement goal research (Kavussanu & Roberts, 1996), female athletes reported lower levels of all the self- and meta-perceptions of closeness, commitment, and complementarity which contrasts with findings using the 3+1 Cs framework (Jowett & Don Carolis, 2003). Results from the third study confirmed the results from the first study only in the case of perceptions of the motivational climate. Male athletes consistently reported perceiving higher levels of an ego-involving climate than females. Differences in self- and meta-perceptions of closeness and meta-perceptions of complementarity relationship between male and female athletes were statistically significant in the third study. The rest of the self- and meta-perceptions of the 3 Cs were not statistically significant.

It is important to note at this point that the sample of the first study comprised club-level athletes, whereas the samples of the second and third studies comprised university level athletes. A possible explanation for the inconsistent results might be the nature of the sample. Jowett and Chaundy (2004) referred to the differences in the two populations, and highlighted the need for more research on identifying the differences between athletes participating in the university context and outside of it. Moreover, Chelladurai and Saleh (1978) mentioned that one of the characteristics of intercollegiate sports teams is the short duration of a team's existence. University athletes assemble at the beginning of the season, which may last just for three to six months. Their pre-season training is even shorter. They claim that "this aspect is much more pronounced in scholastic sports where the seasons are shorter and changes in the roster could be dramatic" (Chelladurai & Saleh, 1978, p. 86). Additionally, although no demographic information on the coach's gender was collected, it is usual for club teams to hire more male coaches, as the percentage of female coaches is very low. It is possible that male athletes tend to associate more and develop closer relations with

their male coaches than females do with their male coaches-which might be a reason for the difference in findings from the first and third studies.

The intention in the first study was to recruit athletes from as many team sports as possible, participating at various competitive and recreational levels, to formulate a representative sample. Nevertheless, the sample was heterogeneous: male and female athletes were not equally represented in the majority of the sports and across all levels. Thus, although the criteria imposed for the selection of the participants made it representative of a specific population within the team sports context (e.g., a wide variety of team sports, various levels of competition), there still exist differences in the culture of each sport (e.g., traditional male sports such as football, rugby), making generalisations about athletes' perceptions difficult for all team sports. The majority of female athletes (70%) in the first study practiced for only 2-4 hours a week, whereas the male athletes reported more hours of training. Thus, a reasonable explanation for the slightly higher levels of closeness, commitment, and complementarity experienced by the male players could also be attributed to the amount of interaction that the majority of them had during training sessions. The samples in the two subsequent studies, studies 2 and 3, were drawn from the university population, where the system and the coaches differ from club teams. No differences in athletes' perceptions were evident in university teams. Both male and female athletes generally perceived high levels of closeness, commitment and complementarity. It could be assumed that coaches hired by university teams should be qualified and normally of a higher standard than those hired by club teams. Each club team, especially at the local levels, imposes its own structure and rules, and sometimes their coaches are previous players, or even rarely volunteers. Caution should be suggested when generalising these results as the effect sizes were all very low thus, one can not place confidence on them.

Associations.

Cross-sectional associations. Drawing from Chaumeton and Duda's (1988) findings, where it was found that coach's behaviour in terms of reinforcements and punishments of the performance process and performance outcome can be viewed through its task- and ego-involving features, it was hypothesised that the relationship formed between the coach and the athlete contains such motivational features. Results of the first study provided evidence to support this assertion. Effective coach-athlete

relationships were found to share common variance with elements of the task-involving climate. In other words, athletes who were close, committed to their coach, and complemented each other in their athletic transactions, were more likely to perceive that their coach cultivated a climate (a) in which learning, mastery of skills and improvement on these skills through effort were the predominant goals, (b) which emphasised cooperation among the team members in order to improve learning, and (c) in which all the athletes were of equal importance in the coach's eyes for the operation and success of the team, because the criteria of success were based on effort rather than ability.

In addition, ineffective relationships (i.e., athletes who scored lower on all 3 Cs) shared a less amount of variance with ego-involving features promoted by the coach. The less the athletes perceived close to their coach or felt committed to their coach, and the less they felt complementary in their transactions, the more they perceived that their coach created a climate in which winning was the emphasised goal and ability the criterion of success. Thus, these athletes were more likely to perceive that the coach would encourage, give praise to, and attend to the stars of the team as they were more able to produce success based on ability criteria. When the athletes performed poorly and made a lot of mistakes, they were more likely to perceive that they would be punished by their coach instead of receiving positive, encouraging and informative feedback. Mistakes in an ego-involving climate are not considered part of the learning process, but are seen rather as indicators of low ability.

Thus, the present results offer a whole new perspective on the context surrounding the athlete and the coach. Sport is a social context in which the relationship formed between coach and athlete is considered central for the athlete's future psychosocial and athletic development. Depending on the goals contained in this relationship, athletes are more likely to become task- or ego-involved and the quality of the athletic experience is determined. Alternatively, depending on the quality of the coach-athlete relationship, certain goals will be emphasised by the coach, subsequently determining the athlete's integrity and optimal functioning.

In conclusion, we can assume that the motivational climate and the coach-athlete relationship are two different but quite similar views of the social sporting environment. Although they are different constructs, both are interrelated social situations. Cooperation for example is a common theme of both constructs. In the

coach-athlete relationship context, co-operation is directed towards the complementary behaviours between the athlete and the coach. In the motivational climate, co-operation is a task-involving feature and is directed towards and reflects the co-operative interactions among the players. Evidence from the first study suggested that these two constructs were very closely related. When coaches and athletes develop co-operative and complementary behaviours during training sessions, and especially when they adopt a friendly stance towards each other and are more receptive to each other's role, they set the example on which peer relationships will develop and operate within the team. Since such a coach is helpful and committed to his/her players, and invests effort, time, and energy in developing the players' potential, while the players are responsive to these efforts, the players are more likely to follow his/her example and help each other improve. Another example is the common element of improvement in the association between the constructs of commitment and effort/improvement. When athletes perceive that their relationship with their coach is built on mutual commitment to the athletic partnership and shared goals and that the coach's role is to help them improve and excel, and subsequently all their efforts are directed towards this goal, the relationship is more likely to be marked with the task-involving features of effort/improvement. When athletes perceive their coach as willing to make sacrifices to advance their skills, potentials and performance, they are more likely to invest more effort and time and to express more willingness to learn new skills, techniques, and strategies. Finally, a common theme in the constructs of closeness and important role is the recognition of acceptance of the athlete. Athletes who like, trust, and respect their coach, and who perceive that their coach likes, trusts, and respects them, are more likely to feel that their coach recognises their role in the team as important, irrespective of their ability. Overall, in an effective relationship, where athletes trust, respect and are committed to a coach who is willing to make sacrifices to advance their skills, potentials and performance, they are more likely to invest more effort and time, to express more willingness to learn new skills, techniques, and strategies, to help each other learn, and to perceive that their contribution to the team is recognised.

On the contrary, in ineffective coach-athlete relationships, especially when athletes perceive lower closeness, they are more likely to view their coach as unfair, uncaring towards themselves and the team generally. It is possible that they will perceive their

coach as being more selective and creating an elitist culture in the team, with only one goal in mind—“win at all costs” (e.g., favouring the best athletes, liking a few selected ones). In a relationship where the coach and athletes do not like each other so much, or hold less respect and trust for each other, where emotional distance is overt, or where there are doubts about their coach’s efficacy in helping them advance their careers, they are more likely to perceive that the coach’s goal is not to improve their skills and teach them new things but to use them as mere success-producers, the means by which the team and subsequently the coach will acquire success. Thus, one is inclined to typify this relationship as more manipulative (Jowett, 2005). Once the athletes do not produce success, punishment might be used as a means for improvement. Improvement is likely to be measured in terms of outcome and not personal mastery of the skills and effort exerted, resulting in exploitation and abuse (Brackenridge, 2001; Jowett, 2005). These associations and comparisons provide initial evidence for the conceptualisation of the coach-athlete relationship in terms of task- and ego-involving features. Previous research showed how the coaches’ behaviours can be conceptualised in terms of motivational cues (Chaumeton & Duda, 1988). This thesis provides further evidence for the extension of previous research, and evidence for the consideration of the coach-athlete relationship in the study of motivational climate when it is examined along with coaching behaviours.

Longitudinal associations. Whereas the first study showed that all the elements of the coach-athlete relationship positively related with all the elements of the task-involving motivational climate, and negatively and moderately related to ego-involving climate at one point in time, the second study was concerned with their course across time. Therefore, the second study showed that across time all the elements of the coach-athlete relationship as perceived directly by the athletes (i.e., self-closeness, self-commitment, and self-complementarity) and their meta-perceptions on the complementarity element predicted later change in unequal recognition perceptions. The prediction finding is important as it confirms for a second time the link between the elements of the coach-athlete relationship and the motivational elements. Its significance is enhanced considering that in the first study the coach-athlete relationship elements were moderately correlated with the ego-involving climate elements and in the second study they were consistently predicting change in unequal recognition. Addressing the second issue, it is worth mentioning that the pattern of

change in the elements of the coach-athlete relationship and in the features of the motivational climate across a nine-month season was evidenced. The predictive power of perceptions of the coach-athlete relationship was shown to be more powerful than the predictive power of the motivational climate features, in the second study, whereas the opposite pattern was observed in the first study. This finding points to a suggestion that the quality of coach-athlete relationships is able to reinforce task- and ego-involving cues.

Due, however, to the lack of theoretical background about causality, and due to the predictive ability of both the factors just mentioned (perception of the coach-athlete relationship, and the motivational climate) one can not infer causality irrespective of the strength of the predictive capability. Bollen (1989) proposed three conditions under which one can infer causation: isolation, association and direction. A dependent variable can only be said to be caused by an independent variable if the influence of the independent variable has been isolated from all other possible influences. It must also be established that changes in the independent variable are linked to changes in the dependent variable. Finally and most importantly, it must be established that the direction of change is only from changes in the independent variable to changes in the dependent variable. Thus, the direction of prediction is from the *initial levels* of the coach-athlete relationship to later changes in unequal recognition and not from *change* in the coach-athlete relationship to changes in unequal recognition. Thus, we can only refer to prediction and not causation. Secondly, in the first cross-sectional study it was shown that all the dimensions of the motivational climate were able to predict some amount of variation in the coach-athlete relationship making difficult to distinguish between independent and dependent variable. Moreover, no other possible influences were controlled for. The importance of identifying which elements of the coach-athlete relationship promote the creation of a task-involving climate, and which elements forestall the emergence of an ego-involving climate, might enable future research interventions to concentrate their efforts on enhancing those elements, and hence help athletes to experience more positive consequences.

Taking into account that higher levels of the 3 Cs can predict less steep increases in an ego-involving climate, intervention programmes have a strong base to focus on maximising the quality of the coach-athlete relationship. Firstly, the fact that the coach-athlete elements are associated with the task- and ego-involving climate

features is promising for future research, as sport psychology researchers might want to incorporate the 3Cs conceptualisation with achievement goal theory to obtain a more complete picture of the sporting environment. Secondly, perceptions of the motivational climate might change from season to season and from period to period within a certain type of relationship between the athlete and the coach, affecting this relationship and being affected by it. The relationship between the two variables might be reciprocal. Thirdly, this informative process will have serious implications on the athletes' need satisfaction and subsequent motivation and optimal performance. The following discussion comments further on this issue.

Associations with outcome variables. Assessing evidence from the third study, it was evident that the two social factors, (a) perceptions of the motivational climate and (b) perceptions of the coach-athlete relationship, predicted the selected outcome variables equally well, through the mediating mechanism of athletes' need satisfaction. Two issues are worth noting at this point: firstly, the impact of both social factors on need satisfaction, and secondly the indirect impact of the social factors on several outcomes. With regards to the first issue, the utilisation of need satisfaction served as a mediating mechanism to the relationship between social factors and outcomes proposed by Duda and Balaguer's (1999) model. Its utilisation in all three sub-studies of Study 3 provided consistent support for the link between social factors and need satisfaction, leading to the suggestion that need satisfaction should be incorporated into the model to explain why these social factors influence athletes' cognitive, affective and behavioural responses. With regards to the second issue, the indirect impact of motivational climate and coach-athlete relationship on the selected outcomes provides support for the proposed links in Duda and Balaguer's model. Athletes' motivation, individual and team performance, satisfaction with personal treatment, satisfaction with individual and team performance, and role ambiguity were predicted by both the coach-athlete relationship and task- and ego-involving motivational climate. Study 3 provided further evidence on the influence of both social factors on athletes' internalisation process and optimal functioning. Additionally, the fact that the coach-athlete relationship predicted equally well the same outcome variables as the motivational climate and the fact that it explained all of them indicates that the coach-athlete relationship should be considered along with perceptions of the motivational climate in the prediction of individual and team motivational responses.

6.4 Strengths, Limitations and Future Directions

It would be foolhardy to suggest that this thesis disentangles the depth and complexity of the interconnections between the two key aspects of the social environment surrounding the athlete, as discussed in the preceding section. This thesis touches upon a fascinating area of research and creates more conceptual and methodological questions and speculations. However, it should be considered as the first opening to a new avenue of investigation, where there is a definite need for meaningfully integrating different theoretical approaches for a better understanding of the athletic experience as it is reported by athletes. Among the major strengths of this thesis, another strong point is the utilisation for the first time of a longitudinal design that describes the course of the motivational climate and the coach-athlete relationship over time, instead of extracting fragmented information from two-point measurements. This thesis not only explains the association between perceptions of the motivational climate and the coach-athlete relationship, and their impact on outcome variables, but also suggests a mechanism through which such impact occurs. The employment of many outcomes variables offers a more holistic picture of the sporting experience and addresses internalisation and optimal functioning issues. However, with regards to those potential effects, caution is suggested, given the amount of variance that is explained in some of these variables. Finally, the recruitment of several large samples of participant athletes provided more valid results and lends more power to the analysis.

The new openings along with later described limitations suggest that there is need for more longitudinal studies adopting more long-term designs with more measured time points, incorporating more variables, and testing more diverse and homogeneous populations. There is need for testing more models, including possible outcomes and antecedents and diverse mediating mechanisms. Yet, what this thesis does highlight is the need for integrating and simultaneously examining perceptions of the situational goal structure along with the athletic relationship formed between the coach and the athlete, as they both can be mutually informative and provide complementary information for describing the social context in the sport realm. A detailed discussion of the limitations with suggestions for future directions follows.

Longitudinal Designs. Lack of longitudinal studies not only limits our understanding of the degree to which perceptions of the environment evolve over the sporting season or over the course of years, but also limits our understanding of how and when specific changes in these perceptions interact with performance improvement and motivation enhancement. The present study monitored the athletes' perceptions across a nine-month academic season. Measurements were taken every three months. These three measurements included a measurement at the beginning of the season, a measurement at the middle of the season and a measurement at the end of the season. A limitation of the present design was that with three time points only linear changes can be detected, whereas as was mentioned earlier, non-linear changes can be detected with more than four measured time points (Curran & Hussong, 2003; Duncan, Duncan, Strycker, Li, & Alpert, 1999; McArdle, 1991). Future research employing more frequent measurements will allow the identification of possible turning points and thresholds in the coach-athlete relationship and motivational climate during the season. For example, time intervals can include a series of successful performances with a sudden slump. By measuring the social factors, mediating mechanisms, and outcomes during the time of successful performances, and before, during, and after the slump point, more information will be provided on how perceptions of the social factors change and how they impact on athletes' performance. Other thresholds might include: newcomers in the team, where the dynamics in the team change, in order to identify how perceptions of the coach-athlete relationship and perceptions of the motivational climate change; injuries, in order to identify changes in both coach's and athletes' perceptions; athletes' withdrawals, in order to identify how perceptions of the social factors contribute to this response.

In addition, by including other possible antecedents and outcomes of the variable under study, one can identify time-varying and invariant predictors of change (Curran & Willoughby, 2003). The inclusion of one or more correlated variables of dispositional or situational nature that are assumed to be associated (a) with higher or lower starting points of the trajectories and (b) with more or less steep increases, will help shed light in the individual variability in the trajectory parameters. The research undertaken in the present thesis included two characteristics of the individual: gender and time spent with coach at the first time point measurement. The two covariates explained little variance in the growth of the constructs. The above-mentioned

covariates were independent of the passage of time (e.g., gender, ethnicity); it might be the case that the covariates (e.g., sex role identity, age) could potentially vary with time. LGM allows for the enclosure of repeated measures covariates and their influences on each time point to be parameterised in the statistical model. A future research direction could focus for example on the measurement of other dispositional characteristics assumed to change over time, such as goal orientations and relationship styles, and on the inclusion of their influence on athletes' motivational climate initial starting point and rate of change. Curran and Bollen (2001) stated that the insertion of the time-varying covariates adds a time-specific "shock" to the system that originates from the individual or the environmental context; thus, change in the repeated measures is not entirely due to the underlying developmental trajectory, but rather to the joint contribution of the underlying trajectory and the time specific influence of another process. For example, the inclusion of injury (a time-varying covariate) might suggest that the change of the motivational climate was partly due to its inclusion.

Integrating quantitative with qualitative methods. The quantitative design of the present thesis allowed flexibility in the treatment of data in terms of statistical analyses, enabling comparison and replication of the design and results, providing objectivity and validity compared to qualitative techniques and designs. Often though, a single methodology fails to explore all the components, manifestations, structures, and mechanisms in a phenomenon or construct. Further longitudinal and cross-sectional research would also benefit from a more thorough examination of the interpersonal relationship between the athlete and the coach, as well as of athletes' and coaches' perceptions of the motivational climate, by conducting in-depth interviews throughout the season to better understand the processes, causes and mechanisms. In-depth interviews might reveal concepts and issues that cannot be uncovered with questionnaires focusing on pre-determined areas, offering an overall picture of the subject under investigation. Nevertheless, advantages of the qualitative methodologies, along with advantages of quantitative methodologies, could counteract the weaknesses of each methodology, supplementing our knowledge, enhancing research, and informing the field further.

Experimental designs. Another limitation is that this thesis' findings and results are strictly correlational in nature because they were derived from correlational analyses within cross-sectional studies and analysis of change; therefore no firm conclusions

can be drawn with regards to causality. These types of analyses cannot disentangle the direction of association, and hence the results can not be interpreted in any causal way. The suggestion made here is that one way to respond to the above weaknesses in inferring causality is to encourage a line of research directed towards experimental work and longitudinal interventions. Manipulation of variables in experimental designs allows the researcher to identify the impact of this variable and infer causation. The use of a control group serves as a baseline to test differences in the variable under study.

Along with the measurement of athletes' perceptions, a promising future research avenue would be to observe the actual relationship and climate, and their preferences for these factors. Although observation of the actual climate was attempted by Chaumeton and Duda (1988), no studies have been conducted so far attempting to observe the actual coach-athlete relationship in terms of its underlying characteristics (i.e., closeness, commitment, and complementarity). Research, experimental in nature, or even observational in character, conducted by well-trained researchers has the potential to contribute a great deal to the description of the actual context, the actual motivational climate and the actual coach-athlete relationship. In such a case, the actual picture of the context could be contrasted to the perceived context, the experienced context, and the desired, preferred or required context.

Mediational mechanisms. Another area that this thesis unearthed was the importance of examining the mediating processes involved in the relations among motivational climate, coach-athlete relationships, types of motivational regulations, satisfaction, performance, and other cognitive, affective, and behavioural outcomes. In the present research, the mediating mechanism of need satisfaction was explored as one avenue of explaining the impact of the contextual factors on various outcomes. There is also a definite call for the examination of more mediating mechanisms that facilitate rather than forestall the impact of the contextual factors on athletes' cognitive, affective, and behavioural responses. Other mechanisms and processes that may potentially mediate the relationship of the contextual environment and several outcomes could be examined either cross-sectionally or longitudinally. For example, it would be fascinating to examine how communication, in terms of communication styles (e.g., Jowett & Poczwardowski, in press; Montgomery & Norton, 1981), aggressive communication through verbal aggressiveness (e.g., Kassing & Infante, 1999) or

corporal aggressiveness (Kassing, Pearce, Infante, & Pyles, 1999), or attachment styles (e.g., Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987) mediate the influence of the coach-athlete relationship on motivation. What would be even more interesting would be to utilise these underlying mechanisms over time, assuming that they give rise to the change. Suffice to say that simply because a developmental curve fits the data well, this does not necessarily explain and identify the causes and regulatory factors of growth (Curran & Willoughby, 2003).

The role of rules in the coach-athlete relationship. Although mediating mechanisms help in the explanation of the impact of the coach-athlete relationship on outcomes, for an effective relationship to be promoted, coaches and athletes should be educated about the structure of an effective relationship, and the means that members of a relationship use to achieve their goals and satisfy their needs. Therefore, what constitutes an athletic relationship, in terms of the roles and the rules (Jowett & Carpenter, 2004) that govern it, or even the required behaviours (Chelladurai, 1990) may supply us with information and guidelines on the appropriate behaviours and expectations that coaches and athletes should adopt. Furthermore, based on these roles and rules, codes of conduct could be introduced to coaching education programs. As sport psychology research has not to date investigated in-depth the athletic relationship's rules and roles, future research should seek to unravel these promising and information-rich areas of social psychology of sport.

Antecedents. More individual differences that could contribute to the formulation of a certain type of athletic relationship and motivational climate should be included.

Athletes' individual differences

Age. The present studies conducted within the boundaries of this thesis used both club athletes and university athletes aged 17 and onwards. The results however are not applicable to other age groups. As Nicholls (1989) argued, children cannot differentiate between ability and effort before the age of 7. Children below the age of 12 understand differently the effort- and ability-related terms from the older children due to the constant development of their operational thought and lack of cognitive maturity (Nicholls, 1978). Variations in how children perceive the motivational climate and the coach-athlete relationship are expected to be salient and evident across

different age groups. At a younger age the influence of the parents is expected to be stronger as the child still heavily relies on them.

Culture. Another limitation of these studies is that participants comprised only English team sport athletes. There has been evidence as to the impact of cultural variability in athletes' perceptions of the motivational climate (e.g., Duda & Allison, 1990) and the coach-athlete relationship (Jowett, 2001; Jowett & Ntoumanis, 2003). This dictates that these studies should be replicated in future research with culturally different samples.

Other antecedents. Maturity level, biological age, gender, sex role orientations, goal orientations, perceptions of ability, and moral attitudes, as well as learning styles (Williams & Anshel, 2000) constitute other potential dispositional factors pertaining to the athlete.

Coaches' individual differences

Social support styles, level of experience, and goal orientations can serve as potential dispositional factors pertaining to the coach. Relationship characteristics, such as length of the relationship between the athlete and the coach in terms of years, and the gender constitution of the relationship (i.e., male coach-female athletes, male coach-male athletes, female coach-female athletes, female coach-male athletes) might play a significant role in developing certain relationships and influencing perceptions of the environment (Jowett et al., in press).

Situational characteristics

Team and sport characteristics. The team's composition can often change during the season, significantly affecting athletes' perceptions of the climate in the team and the team's cohesiveness (Turman, 2001). The type of sport (e.g., contact vs. non-contact, interactive vs. parallel, traditional vs. contemporary, high risk vs. low risk) is also expected to involve different social environments (Jowett et al., in press).

Type of Relationship. A series of qualitative studies (e.g., Jowett & Meek, 2000a, 2000b; Jowett, Timpson-Katchis, & Adams, 2005) have shown that several types of coach-athlete relationships exist. These types of coach-athlete relationships include typical and atypical ones. Typical relationships refer to a relationship between a coach and an athlete who are connected in no other way than by their athletic relationship.

Atypical relationships include coaches and athletes who are connected by bonds other than athletic ones. Examples of such bonds include marital, familial, romantic relationships (Jowett et al., in press) where the athletes and the coaches have dual roles. Examples of such relationships with dual roles are when the parent is the coach and the child is the athlete, or the husband is the coach and the wife is the athlete. The type of relationship between the athlete and the coach is assumed to significantly affect its members (Jowett et al., in press). Although constitution of the athletic relationship is the same in terms of the 3 + 1 Cs in all types of relationships, the intensity with which the relationship members experience these elements might differ. It would be interesting to examine perceptions of the coach-athlete relationship and the motivational climate in teams where such relationships exist.

Bidirectionality of views. A limitation of this thesis pertains to the fact that it did not account for the coach's perspective. Consequently, the explanation of the social structure and relationships involve only one party, the athlete, and is therefore single-sided. As only the perceptions of team sport performers were examined in this thesis, it was difficult to assess their coach's views on his or her athletic relationship with each one of the players in the team, especially in large teams. Noteworthy though, is that athletes' views on the coach-athlete relationship and their perceptions of their coach's views on the same elements of the relationship (i.e., meta-perceptions) were collected for this thesis. Surprisingly, more variance in need satisfaction was accounted for by meta-perceptions than by self-perceptions of the coach-athlete relationship or by perceptions of the task- and ego-involving motivational climate. Moreover, additional longitudinal work involving athletes and coaches' perceptions is needed to identify the bidirectionality of the relationships and perceptions and areas of congruence, agreement/ disagreement, and understanding/ misunderstanding. This could be accomplished by measuring both coaches' and athletes' perceptions of the relationship and the climate in the team. Although, measurement of coach's perceptions of the coach-athlete relationship is attainable, due to the existence of the CART-Q version for coaches, the measurement of coach's perceptions of the motivational climate is not feasible due to lack of instrumentation. Future research should concentrate on developing an instrument to this end, enabling the comparison between athletes' and coaches' perceptions of these factors.

Unit of analysis. Longitudinal, as well as cross-sectional studies should use the dyad (i.e., the coach and the athlete, or the coach and the team) or the team (i.e., the team as a whole, an intact team) as the unit of analysis, in order to map the relationship existing between the two at different points in time and at thresholds of change. For example questions such as “Do relationships where the coach and athlete are more compatible, or experience the same levels of closeness, commitment, and complementarity, produce better performances and more well-being?”, require the adoption of a dyadic research design (Maguire, 1999). Questions such as “Do athletes’ perceptions of the motivational climate and the coach-athlete relationship differ among teams at one point in time and in the way they change over time?” require analyses involving multilevel modelling techniques. Finally, questions such as “How do perceptions of the coach-athlete relationship as experienced from each dyad (coach-athlete) differ among members of the same team?” require measurement and analyses at a ‘dyad-level within a group’ (see Kashy & Kenny, 2000).

Assessing profiles. Based on Jowett’s (2005) categorisation of effective/ineffective relationships and successful/unsuccessful relationships, it would be very interesting to examine athletes’ perceptions in terms of profiles. Jowett described effective and ineffective relationships in terms of how much emphasis is placed on positive growth and development as an athlete and a person. Therefore, the coach-athlete relationship goes over and beyond sport development and the realm of sport itself. Among the underlying characteristics of an effective relationship is the development of the athlete’s skills and potential, implying a task-involving approach that indeed focuses on skill development and mastery, as suggested by Nicholls (1989), but goes further to where a concern about the welfare of the athlete is salient (Jowett, 2005). In an effective relationship and a task-involving climate, the aim and focus is on learning and mastering skills, and the coach is seen as the one who establishes the foundations, and facilitates the process and the athletic relationship as the vehicle that will lead them to fulfilling their goals and needs (Jowett & Cockerill, 2002).

Successful relationships, according to Jowett (2005), entail the element of ability and are oriented towards outcomes. Thus, successful coach-athlete relationships are those that lead for example to the acquisition of a medal, whilst unsuccessful relationships are those that end in failure (i.e., failing to achieve a normative standard). These types of relationships could be categorised as ego-involving. Likewise, according to

Nicholls (1989), success judged by normative criteria is the main characteristic of an ego-involving climate. In contrast, failure to achieve a medal while having performed one's best or having improved can be still characterised as success in a task-involving climate and effective coach-athlete relationship. The debilitating effects of success evaluated in a normative fashion will not result in devastating and negative consequences for the athlete, for the coach, or for their athletic relationship.

In Jowett's categorisation, effective versus ineffective and successful versus unsuccessful relationships are theorised to be orthogonal. An athlete could possibly perceive a relationship as both effective and successful, or effective and unsuccessful. It would be important to investigate possible athletes' profiles in terms of this distinction and in addition motivational climate profiles, to ascertain which is the most fruitful and conducive profile for athlete's motivation, well-being, and optimal functioning.

Instrumentation. Many studies fail to adequately describe certain constructs such as subjective or objective performance, need satisfaction, motivation. Measurement inadequacy represents a major limitation for the generalisation of the results, and raises issues of placing confidence in the findings. Attempting to compare findings from studies investigating the same concept using different underlying dimensions becomes problematic. For example, research studies that have utilised the IMI as a measure of intrinsic motivation (e.g., Kavussanu & Roberts, 1996), comprising factors such as interest/enjoyment, tension/pressure, when paired with studies that have examined intrinsic motivation with the SMS (e.g., Brunel, 1999) which measure enjoyment and tension not as underlying factors of motivation but as outcomes, may raise certain theoretical and methodological issues. Similar results have thus arisen from different roots and different perspectives. A fundamental assumption in utilising the PMCSQ-2 as a measure of the coach-created motivational climate could receive the slight criticism that it does not exclusively tap the coach's emphasised goals, but uses the contribution of the peers' influence as well. Certain items of the PMCSQ-2 do not include the wording "by the coach", thus do not explicitly call for attention to the role of the coach in creating the climate. Nevertheless, Seifriz et al. (1992) and later Newton et al. (2000) initially intended to develop an instrument to measure the situational goal structure created by the coach. Moreover, unless instruments measure precisely what they purport to measure, one cannot compare the findings resulting

from the use of these instruments. Sport psychology research that provides consistent, reliable, accurate and precise instruments for measuring the targeted aim might profit both theoretically and empirically. Although many studies on motivation have contributed valuable elements to the repertoire of achievement goal theory and self-determination theory, it is necessary to be clear about the types of information they can offer, their strengths and limitations.

Lastly and more importantly, a variety of future directions have been suggested in the discussions above. As many researchers have highlighted, contextual factors hold genuine potential for fruitful manipulation during interventions aimed at improving the performance, well-being and motivation of athletes. The present work indicates that recognition of the coach-athlete relationship and the motivational climate as a vehicles for enhancing the overall well-being and optimal functioning of the athlete, should direct the focus towards satisfying the athletes' basic psychological needs.

Despite the limitations described above, this thesis provides a more accurate picture of the coach-athlete relationship and the motivational climate as they pertain to the athletic context. Researchers and coaches would benefit from the application of findings concerning the impact these two contextual factors have on athletes' motivation, performance, satisfaction and role ambiguity. Notwithstanding that these proposed relationships and mediating mechanisms should be studied longitudinally, intervention studies are imperative in order to be able to draw more solid and concrete conclusions on the causal links among the variables. Hopefully this research will provide guidance for future studies in terms of topics, as well as design and methodology.

6.5 Practical Implications

Taken together, the findings from the present thesis suggest that the creation of effective, working coach-athlete relationships with task-involving features is conducive to development of athletes in several domains. Consistent with Ames' work and findings in the educational context, and with Duda's work and findings in the sport context, a task-involving climate is conducive to and positively related with adaptive outcomes (e.g., performance, satisfaction) and intrinsic motivation, whereas an ego-involving climate is linked to more maladaptive responses. Present results are also in agreement with Jowett's (2001, 2002, 2005) propositions that an effective

coach-athlete relationship contributes to increased athlete satisfaction and more adaptive outcomes, such as more cohesive teams.

Thus the central point of any future interventions and the main focus of coaches should be the enhancement and maintenance of a close, committed and complementary coach-athlete relationship and the promotion of task-involving motivational cues. Failure to create such factors might lead to conflict, misunderstanding and dissatisfaction on the part of the athletes. If coaches structure and maintain a team climate throughout the season that emphasises co-operation, hard work, and self-referenced improvement, and establish a relationship that promotes trust, respect, commitment, and complementarity in behaviours, athletes' needs are more likely to be satisfied. Regular meetings between the coach and the team, where performance goals are decided by both sides, and where athletes' opinions and inputs are equally valued and heard, help in the development of athletes' sense of control over their training and participation. By regularly providing informative, constructive, and encouraging feedback both to the team as a whole and to individuals in the team, athletes' sense of control and sense of competence will be enhanced and their need for relatedness will be met. Fulfilment of their needs will in turn affect their interpretation of success and performance, their satisfaction and their motivation. While it is critical that coaches satisfy athletes' basic psychological needs, other contextual variables may play a significant role in athletes' satisfaction of their needs, and in turn other mediating mechanisms intervene in the impact of the coach-athlete relationship and perceptions of the coach-created environment on several outcomes.

The CART-Q is a very useful tool for identification of areas of conflict and for use in intervention programmes (Jowett, 2002; Jowett & Cockerill, 2002). By administering the instrument to both coaches and athletes, sport psychologists can measure closeness, commitment and complementarity at a particular point in time. Measurement of athletes' and coaches' self- and meta-perceptions on the 3 Cs can be used in drawing dyad maps to pictorially identify and measure levels of the three types of co-orientation: actual similarity, assumed similarity, and empathic understanding. Differential levels of actual similarity on the construct of commitment for example, might denote disagreement in performance goals. By using Performance Profiling technique (Kelly, 1955) coaches and athletes guarantee that they are "on the same page" (Dale & Wrisberg, 1996). Thus focusing on re-evaluating the goals may provide

a solution to the disagreement. This tool can be used even at different time periods, for example at the preparation period, at the peak performance period, or at the end of the season. Administration at each specific time will yield information and highlight the areas that require intervention.

Although the coach is the main architect of the motivational climate, other people contribute to the creation of the climate as well. Thus, it is of great importance that involvement of parents and peers in the process of fostering different goal perspectives be assessed. The relationships that parents and peers form with the athlete are of equal importance to the coach-athlete relationship, as they interact with each other within the athlete's sport network, and therefore the perceptions that parents and peers have of their relationship with the athlete should also be assessed. Hence, the larger psychosocial environment, in which the coach-athlete relationship and the coach-created motivational climate play an important role but of which they are nevertheless only a small part, is really crucial to understanding and predicting affective, cognitive and behavioural responses in the sport domain. Interventions could be directed towards the parents of the athletes. Short educational workshops of how parents' involvement promotes certain task- and/or ego-involving cues could help them identify the motivational climate that they promote and adjust accordingly their behaviours. Seminars and workshops on the involvement of the parents in the athletic triangle (athlete-coach-parent) could provide useful information for improvement of the relationship. Accordingly, team meetings during workshops to disentangle the social relationships among the members of a team could improve the team climate and their relationships.

Jowett (2005) has suggested that the way forward lies with open channels of communication. Thus, communication might be the key to resolving role ambiguity in a number of areas: the behaviours necessary to carry out those roles; relationship conflict; erroneous problems; identifying main areas of disagreement, such as inconsistent goals; and the criteria for evaluating these behaviours and goals. From this perspective, communication skills become essential tool for coaches to build common ground with their athletes (Anshel, 1997). Thus, the incorporation of social skills in coach education programmes should be promoted. Coaches who are well equipped and competent in developing effective coach-athlete relationships will have satisfied and intrinsically motivated athletes.

Coaches and athletes can enhance their communication skills and be educated in techniques used to enhance the communication process, such as effective listening and effective questioning. When there is a communication problem in the team with the coach, individual or team meetings with the coach should be held in order to discuss and resolve the misunderstanding. Burke (1997) discussed two types of communication: one-way communication (Watkins, 1991) and two-way communication (Dawson, (1985), the first of which is also referred to as mass communication. One-way communication is used when the coach wishes to speak to the entire team –with the entire team being the receiver; and two-way communication is used to send a message making sure that the individual receiver understood the message. When the coach adopts the two-way type of communication, the athlete is given the opportunity to ask questions and respond to the coach as message-sender. Effective questioning, active listening (Martens, 2004), and empathic understanding are skills that once cultivated and well developed in coaches and athletes can realize the potential of improving communication. One-to-one meetings and discussions can help identify the areas of disagreement and misunderstandings and through clear and meaningful team and one-to-one feedback based on effort and mastery, not demonstration of ability, increase athletes' perceptions of competence and satisfy their need for relatedness. These communication skills (as they fall under life skills) can later be transferred to other areas of the coach's and the athlete's lives and facilitate their psychosocial development and functioning.

Double (mixed) messages from the coach—that arise from poor matching of their verbal and non-verbal messages and often result in confusion, frustration, and distrust (Schienberg, 2003)—constitute some of the blocks to interpersonal communication that once identified can be dealt with to improve communication. These messages are differentially interpreted by each athlete depending on the athlete's assumptions and attributions of the coach's intention, meaning, emotions and key words. Messages can be interpreted positively or negatively. Regular meetings with the team members and workshops on improving their communication skills might have an effect on the relationships among the team members and between the athletes and the coach. Another issue that holds the potential to impair communication and lead to deterioration of the coach-athlete relationship is a disparity in relationship needs of coaches and athletes. Identification of the coach's, the individual athlete's, and the

team's needs could help reconcile differences and brainstorm ways of satisfying them. Even when the first step is taken, which is the identification of the different needs, the realisation on part of the coach and the athletes of the difference and/or the overlapping of the needs helps in their satisfaction.

Coaching education programs should be focused on enhancing coaches' skills in building communication bridges and positive relationships with the goals of facilitating optimal sport involvement and performance. The literature suggests that athletes in general prefer coaches who communicate with them and let athletes contribute to decision-making (Truman, 2003). Regular team meetings are required to clarify, establish, or reset numerous items: common goals, criteria of success, evaluation methods, and well-defined roles, behaviours and responsibilities. Such meetings help establish a friendlier and closer climate in the team, enhance the coach-athlete relationship, offer a sense of control to the athletes, and allow their input to decision making, thereby enhancing their commitment. In these team meetings, trust, respect, and commitment, as well as complementarity, are built through setting and deciding team goals,, collectively by the coach and athletes.

As the coach and the athlete together form a system, their own views and meta-perceptions of each other regarding their relationship should be considered simultaneously in order to provide information for a more complete representation of the relationship. Because a change in the system might transform the function of the whole system, educational programs on the role and the importance of the coach-athlete relationship targeted towards the coaches might have a positive impact on the athletes' psychosocial and sport development. If working, effective, and positive coach-athlete relationships are to be promoted, they should first be introduced in coach-educational programs. The coach's role is regarded as fundamental in this process. One of the coach's essential responsibilities is to help individual players and members of teams to achieve their maximum potential. This will be achieved within the development of positive coach-athlete relationships based on mutual respect, trust, commitment, and co-operation. Coaches are called upon to create the climate and type of relationship that will be more conducive to satisfying their athletes' psychological needs.

CHAPTER 7

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7 References

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8 Appendices

8.1 Appendix 1: Ethical Approval form for Study 1

Application for Ethical Approval of Research Project

This form must be completed by the researcher, and submitted (in the case of undergraduate –and graduate projects) to the designated supervisor, who should consider it and if approved, then forward it to the School Research Ethics Committee. The latter should keep it on file as an agreed record of the research being undertaken. Proposals for staff research projects that require ethical approval should also be considered by this Committee.

1. RESEARCHER

Name: ALKISTIS OLYMPIOU

School: of HEALTH

Supervisor/ Head of Field: SOPHIA JOWETT

Academic status of applicant: PhD SCHOLAR

Commencement and expected duration of project: 3 YEAR FULL TIME

2. RESEARCH PROJECT

Please offer a brief paragraph indicating answers to the following questions where relevant:

Where the research is to be carried out;

Whether adequate facilities are in place enabling the project to be properly carried out;

Whether procedures are in place given the occurrence of any adverse event;

Names of other individuals or organisations involved in the project;

Whether other approvals have been gained or are to be sought.

The administration, completion and collection of the questionnaires by the players-participants will take place at the training grounds, before their training session.

No extra facilities are required any other than those that are in place to enable the project to be properly carried out. Data analysis will be employed through SPSS program, already existing in the university.

Physical or psychological harm to the participants through the administration of the questionnaires is extremely unlikely. However in the unlikely event that any adverse psychological harm should arise the participant(s) would be referred to an appropriate counsellor.

Data will be collected by the distribution of questionnaires to the players that will participate voluntarily in the project. The coach of the team will be informed as well and will be asked to consent for his athletes' participation.

No other approval is to be sought.

3. PURPOSE OF RESEARCH PROJECT

Please offer a brief paragraph indicating:

The aims and objectives of the project;

Its rationale;

The research question or specific hypotheses to be tested;

The background to the project.

Title: AN EXAMINATION INTO THE ASSOCIATION BETWEEN THE COACH-ATHLETE RELATIONSHIP AND THE MOTIVATIONAL CLIMATE IN TEAM SPORTS.

Research question

Due to the exploratory nature of the study, the main focus and general objective is to investigate the association between the coach-player relationship as determined by the "3+1 Cs" and the motivational climate, as these constructs are perceived and experienced by the players.

The aims of the investigation are:

- a) To expand and study the integrated model of coach leadership in team sports (Duda & Balaguer, 1997).
- b) To incorporate the conceptualisation of the coach-athlete relationship (3+1 Cs: Jowett, 2001; Jowett & Meek, 2000; Jowett & Cockerill, in press) in the integrated model of Coach leadership and motivation.
- c) To examine the potential interactions proposed by the integrated model.

Theoretical basis of the investigation

Anecdotal evidence supports the hypothesis that one of the most important factors in achieving success in sports is the player's relationship with his/her coach, especially one that is based on mutual trust and reciprocal communication. The importance of the effective and compatible coach leadership behaviour for the player's performance and satisfaction, and general well being, is a recurrent theme and subject of investigation in the sport research. Researchers in this area, have carried out their studies under the general assumption that the type of leadership behaviour exhibited by the coach will have a significant impact on the players' performance and/or their psychological or emotional well-being (Horn, 1992).

The dynamics between the coach and the players have been widely studied by two models: the multidimensional model of coach leadership (Chelladurai, 1980, 1990) and the mediational model of coach-player relationships (Smoll & Smith, 1989; Smoll, Smith, Curtis & Hunt, 1978) both of which have examined the coach-player relationship from a leadership perspective. More recently, Jowett and her colleagues (e.g., Jowett, 2001; Jowett & Meek, 2000; Jowett & Cockerill, in press) proposed an alternative integrated conceptual framework (3+1 Cs) in an attempt to capture, examine and understand the substance and nature of the coach-athlete relationship, from a relationship perspective.

Duda and Balaguer (1997) proposed an integrated model in which certain tenets from goal perspective theory (Ames, 1992; Nicholls, 1989) have been incorporated with variables and interactions stemming from Smoll and Smith's mediational model (1989) and Chelladurai's multidimensional model (Chelladurai, 1980, 1990). The model explains that coaches' actual behaviours with players' perceptions of and preferences for coach behaviours influence the players' perceptions of the motivational climate. The motivational climate (or situational goal structures) refers to the way an individual construes his/her level of competence and consequently defines success in specific settings.

Duda and Balaguer's work (1997) provides a framework that combines for the first time, in terms of a conceptual model, effective leadership and perceptions of motivation and goal orientations. However, the model does not incorporate a possible interaction between the motivational climate and the coach-player relationship although serious implications have been suggested by Jowett (2001a). She proposed that the coach-athlete relationship in terms of the 3+1 Cs, can serve as an important motivational element or even a moderator factor of goal orientations and motivational climate. Thus, an extension of the integrated model of coach leadership and motivation (Duda & Balaguer, 1997) is proposed in the present study by connecting the perceived motivational climate with Jowett's and Meek's (2000) conceptual model of coach-player relationship, the 3+1 Cs, in the team sporting environment.

The purpose of the present study is to obtain a more comprehensive insight into how the relationship between the coach and the players (and not only the coach's behaviours) affects the perceived motivational climate created by the coach or vice versa. In order to have a more consummate picture of the association between the 3+1 Cs with the motivational climate, attention must be addressed to the antecedents and the consequences, such as the athletes' goal orientations, the age and gender of both the players and the coach (individual characteristics), the type of sport (situational characteristics) and players' self-confidence and self-esteem (consequences).

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NB. It is not the job of the School Research Ethics Committee to consider the methodology of the research project. However this Committee does need assurance that the appropriate methodology has been properly considered before it can consider whether the project is ethically justifiable.

4. BRIEF OUTLINE OF PROJECT

Please offer a summary of the procedures it is proposed to follow in carrying out the project. Such descriptions might vary according to the nature of the project and the academic area involved, but they should normally include at least the following:

The design of the project (including, where appropriate, issues of statistical power);

The procedures to be followed;

The participation of subjects in the project;

How the design of the project and the procedures followed are likely to assess the research question or test the hypothesis in question or establish some significant result.

METHODOLOGY

Studies using quantitative designs can be used to test hypotheses. Hypothesis is defined as a statement specifying the relationship between two or more variables, is therefore a testable proposition (Kelly, 2000). In logico-deductive theorising and natural research designs, variables are defined, operationalised, and measured, and predetermined hypotheses are tested and then accepted or rejected (Sage, 1989). In this study the variables are easily identified, namely coach-player relationship and motivational climate, while the main aim is the testing of the proposed integrated model of Coach leadership and motivation (Duda & Balaguer, 1997).

Participants

The sample will comprise 550 male and female British players in team sports (e.g. hockey, rugby, football). The players will be members of clubs different competitive levels. Ages will range from 16 to 40. More specifically:

Participants comprising the sample will be selected on the following criteria:

a) Players participating in the study will belong to club teams and not to university teams. It is frequent that university teams practice without a coach. Therefore, the present study will concentrate in athletes from club teams, because the players tend to commit with the team and the coach for a longer period of time, as to the preparation period and the competition period, so there is a greater interaction between the coach and the players, and a motivational climate will have been established.

Chelladurai and Saleh (1978) mentioned that one of the characteristics of sports teams is the short duration of existence in a team. University players assemble in the beginning of the season which may last just for three to six months. Their preseason training is even shorter. They claim that "this aspect is much more pronounced in scholastic sports where the seasons are shorter and changes in the roster could be dramatic" (Chelladurai and Saleh, 1978).

b) Furthermore, the sample will be constituted from both genders (male and female players).

c) The chronological ages of the participants will range between 16-40, namely adolescent/adult players.

d) The level of competition will compose another significant criterion for the selection of the sample. Participants will be drawn from three different club divisions.

Procedures and Data Collection

In order to get in contact with the participants, the following procedure will be applied:

A letter will initially be sent to the coaches of the teams followed by a telephone call, to introduce them in the aims and the purpose of the study, to raise their interest, to guarantee confidentiality of the information provided and finally ask them for their consent in the study. Coach's consent deemed to be the most appropriate for the team's participation in the study, as the coach is the natural leader of the team. The administration, completion and collection of the questionnaires will take place at the training grounds, before the training session. A booklet comprising two questionnaires will be administered at

the athletes. At the front page, demographic information will be required (age, gender, level of competition, years in sport, years in the team, years with the coach).

The researcher needs to be present at the process of data collection to ensure the validity of the procedure and to clarify any questions that may arise. Furthermore, the researcher will be able to minimise possible coach's or team-mates' interferences and influences during the completion of the questionnaires, and build rapport, trust and a friendly environment with the participants.

Instrumentation

a) The Coach-Athlete Relationship Questionnaire (CART-Q) (Jowett & Ntoumanis, 2002) will be employed to measure the nature of the coach-athlete relationship. It is a 11 item questionnaire, with 3 items measuring commitment (e.g., I feel close to my coach), 4 items measuring closeness (e.g., I like my coach) and 4 items measuring complementarity (e.g., When I am coached by my coach, I feel at ease). The construct of Co-orientation relative to Closeness, Commitment and Complementarity is measured by CART-Q/M: meta-perspective (Jowett and Cockerill, in press), a modified version of CART-Q that measures coaches' and athletes meta-perspectives (e.g., When I am coached by my coach, my coach feels at ease). All items were measured on a 7-point scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

b) The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) (Newton, Duda, & Yin, 2000) which assesses athletes' perceptions of the motivational climates in their teams. It is a 29 item questionnaire with a 5-point Likert-type response scale, (1=strongly disagree; 5=strongly agree). The second version of the PMCSQ was developed for further improvement of the instrument, as Newton, Duda, and Yin (2000) mentioned "The PMCSQ might be strengthened by conceptualising the motivational climate in a hierarchical manner with subscales underlying the higher order Task-involving and Ego-involving scales". It includes two higher order dimensions which are composites of six underlying characteristics. The two higher order dimensions are the perceived task-involving climate and the perceived ego-involving climate. The task-involving climate scale reflects the dimensions of: Cooperative Learning, Effort/Improvement, Important Role. The ego-involving climate scale reflects the dimensions of: Intra-team member rivalry, unequal recognition and punishment for mistakes. An example of the a task-involving scale item is "On this team, each player contributes in some important way". An example of an ego-involving scale item is "On this team, players are afraid to make mistakes".

Data Analysis

In the present study structural equation modelling will be adopted in order to analyse the data. Structural Equation Modelling (SEM), (or Causal Modelling, or Causal Analysis, Simultaneous Equation Modelling, Analysis of Covariance Structures) has become in recent years an increasingly popular statistical approach (Biddle et. al., 2001) especially in behavioural and social sciences. It is a combination of multiple regression analysis and factor analysis. Like factor analysis, some of the

variables can be latent, while others are directly observed. Like canonical correlation, there can be many independent variables and many dependent variables. And like multiple regression, the goal may be prediction.

This technique evaluates whether the model provides a reasonable fit to the data, and the contribution of each of the independent variables to the dependent variables (Tabachnick and Fidell, 1996). SEM provides a method by which the relationships between latent variables can be estimated while taking account of measurement error. The model can be tested for how well it fits the data and individual parameters can be subjected to significance tests. It combines two aspects: a) the structural model in which hypothesised structural relationships between latent variables can be specified and tested and b) the measurement model in which hypothesised relationships between latent variables and the observed variables can be specified and tested. It can also be used to test hypothesised structural relationships between observed variables, as in traditional path analysis.

Sample Size

Many rules have been suggested in terms of the sample size required for reliable factors. Moreover, it was proposed that the sample size be determined as a function of the number of variables being analysed, ranging anywhere from two subjects per variable to 20 (Stevens, 1996). SEM like factor analysis is a large sample technique. In the use of factor analysis, Tabachnick and Fidell (1996) suggest as a general rule of thumb, that it is comforting to have at least 300 cases for factor analysis. But because in SEM there is no linear relationship between number of variables and number of parameters, it would be more helpful to decide about the number of the subjects per estimated parameter.

Bentler and Chou (1987) suggested that the ratio of sample size to number of free parameters of at least 10:1 may be more appropriate for arbitrary distributions. Based on these premises, 55 parameters are estimated at the present study, therefore 550 participants are considered an adequate sample for the analysis of the data.

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5. RECRUITMENT OF SUBJECTS

This section should contain clear information indicating the basis on which the proposed participating subjects are appropriate to the project. Normally researchers should adequately answer the following questions:

The number of subjects involved in the study (including the adequacy of the sample size) and how it is proposed to recruit them;

Whether there are any inclusion or exclusion criteria, together with their justification;

The age range of subjects; the gender balance of subjects; and the state of health of subjects;

Whether there is any inducement to participate in the study;

Whether the project involves any special groups requiring some additional justification or permission (e.g. whether subjects are especially vulnerable, i.e. children, students, the elderly, those with learning difficulties, those with some disadvantage or dependency, those in hospital or those in prison).

Participants

The population consists of players in team sports, male and female, across the UK. The subjects will not be recruited from a specially vulnerable group, such as children, elderly, or disabled players. The participants will consist of volunteering players not exhibiting an observable psychological and physical abnormal behaviour and symptoms.

(see Methodology section: 'Participants' for more details)

6. PARTICIPATION OF SUBJECTS

Please provide two documents. These are an Information Sheet and a Consent Form, and each should be attached to your application. The first must ensure that the subject has a proper understanding of their participation in the project, and the second that they have given informed and voluntary consent to their involvement in it. Some notes for guidance follow.

INFORMATION SHEET

This will be provided to the subject prior to taking consent, and must explain the broad purpose of the project, the basis on which the subject has been chosen, what is required of the subject in the project, whether there are any possible disadvantages or risks in taking part, the benefits gained by taking part (either to the subject, the researcher or the scientific community), what will happen if something goes wrong, what happens to any information obtained about the subject, the expected results of the study, who is responsible for it, and a contact name. The Information Sheet must be written in a clear, informative, and intelligible way.

The Information Sheet must include a description of how subjects are involved in each stage of the study. This should relate back to §4 above. Their participation will vary according to the nature of the project, but will explain what is required of each subject (i.e. what kinds of measurements or observations will be undertaken, and by what means) and especially those that involve some risk or discomfort or which have other ethical implications (i.e. administration of substances, sampling of bodily fluids or tissue, or placebo or control groups, or genetic information).

CONSENT FORM

A properly designed Consent Form must also be attached to this application. It should include [a] the title of the research project as in Section 2 above, [b] opportunity for confirmation by the subject that they have read and understood the Information Sheet (see above) and have been able to ask questions, [c] that their involvement is voluntary and that they have the right to withdraw at any time without providing reasons and without their rights being affected, and [d] that they understand that personal information about them may be looked at by researchers or other responsible individuals.

The Consent Form should indicate how individual informed and voluntary consent will be obtained. Sometimes (as in the case of Question 5 in §5 above) it will be necessary to indicate how parental or guardian agreement will be obtained.

The Consent Form must include space for properly dated signatures of the subject that they agree to participate in the project, together with the names of the person taking consent and/or the researcher.

INFORMATION LETTER AND CONSENT

A letter to invite participation in the study and inform the prospective participants about the aim and context of the study will be sent. The actual return of the questionnaires will count as their consent. Since the questionnaires are addressed to players and more specifically adults, no other interested parties are identified whose approval is required.

Participants under 18 years of age will be asked to sign a consent form.

The information letter and the consent form are attached.

7. INFORMATION AND DATA

The application must contain a clear statement of what information will be collected about each subject, the data obtained as part of the procedures described in §4, how it is proposed the data will be stored, how the data contributes to the project, together with a statement of how long it will be stored and how eventually discarded.

Please offer answers to the following questions:

What information about the subject do you wish her or him to disclose to you in order for the project to commence?

What data will be gained about the subject in the various stages of the project?

What form does this data take (measurements, observations, audio/video tape recording)?

How will this data be stored (manually or electronically)?

How is protection given to the subject (e.g. by being made anonymous through coding and with a subject identifier code being kept separately and securely)?

What assurance will be given to the subject about the confidentiality of this data and the security of its storage?

Is assurance given to the subject that they cannot be identified from any publication or dissemination of the results of the project?

Who will have access to this data, and for what purposes?

How is the data relevant to the project and the determination of its results?

How will the data be stored, for how long, and how will it be discarded?

Data from the first study will be collected by means of questionnaires, that will be anonymous. The information will evolve around players' perceptions of the Coach-Player relationship and the motivational climate. The distribution of the questionnaires will be carried out by the researcher herself. The studies that will be conducted will involve quantitative research. Data for the subsequent studies, will be gathered again through means of questionnaires. The data will be stored and analysed electronically. No one will have access to the data apart from the researcher and only for purposes of the research.

8. RISK, HARM AND OTHER ETHICAL CONSIDERATIONS

This final section invites an estimate by the researcher of the perceived benefits or outcomes of the project weighed against the possible harms caused to the participating subject. Please submit two brief paragraphs. The first should identify both [a] any potential risks or hazards that might be caused to

subjects or the researcher, in addition to any discomfort, distress or inconvenience to them, together with any ethical problems or considerations that the researcher considers to be important or difficult in the proposed project; and [b] offer an explanation of how it is proposed to deal with them, along with any justificatory statements.

The data to be gathered will contribute to the existing scientific knowledge and will provide a conceptual framework through which sport psychologists will be able to contribute to the improvement of coach-athlete relationship and the area of motivation, resulting to the enhancement of athlete's performance and well being. Should the players feel uncomfortable or feel that the disclosure of their perception of their relationship with the coach violates their privacy, they are allowed to withdraw any time from the research project.

Physical or psychological harm to the participants through the administration of the questionnaires is extremely unlikely. However in the unlikely event that any adverse psychological harm should arise the participant(s) would be referred to an appropriate counsellor.

The second paragraph provides an opportunity for the researcher to highlight any remaining ethical considerations and to respond to them in a way which may assist the Research Ethics Committee in arriving at some judgement upon the proposal. This second paragraph is not an invitation to take on the work of the Committee, but rather emphasises the expectation that both researcher and Committee share the responsibility for assuring that the proposed research will be carried out ethically and with full regard to ethical principles.

N/A

9. SIGNATURES OF RELEVANT PERSONS

I undertake to carry out the project described above in accordance with ethical principles. I have completed the application in good faith. I accept that providing false information constitutes scientific fraud and will be subject to appropriate disciplinary procedures.

Signature of Researcher Date

I have examined this proposal, confirm that the rationale and methodology is appropriate and that it can proceed to the stage of ethical consideration.

Signature of Supervisor or relevant Head of Unit Date

This research proposal has received ethical approval either by a supervisor on behalf of the Committee or has been considered by the Committee and received ethical approval.

Signature of Chair of School

Date

Research Ethics Committee

8.2 Appendix 2: Invitation for participation letter for Study 1

3rd December 2002

Dear coach,

I am a Doctorate student at Staffordshire University studying the manner to which the coach-athlete relationship affects athletes' perception of the motivational environment developed by the coach. I would greatly appreciate your teams' participation in my research project in Motivational Climate and Coach-Athlete relationship.

Your team's participation includes to respond to two questionnaires (the time of completion is approximately 15 minutes). The administration and completion of the questionnaires will take place before a practice session, on your training grounds.

If you wish I would be happy to discuss the research project in some detail on the phone.

Hopefully, you will find time in your busy schedule to participate in this study.

Yours faithfully

Alkistis Olympiou

PhD Student

Sport, Health and Exercise

School of Health

Staffordshire University

Leek Road

STOKE-ON-TRENT

ST4 2DF

Tel. no.: 01782 295977 or 07985437143

E-mail: A.Olympiou@staffs.ac.uk

8.3 Appendix 3: Questionnaire for study 1

Please complete the following information:

Sport: _____

Age: _____

Gender: Male / Female

| | | |
|-------------------------|------------------------|----------------------|
| Years with team: | 0-6 months | <input type="text"/> |
| | 6 months-1 year | <input type="text"/> |
| | 1-2 years | <input type="text"/> |
| | 2-3 years | <input type="text"/> |
| | 3 years or more | <input type="text"/> |

| | | |
|--------------------------|------------------------|----------------------|
| Years with coach: | 0-6 months | <input type="text"/> |
| | 6 months-1 year | <input type="text"/> |
| | 1-2 years | <input type="text"/> |
| | 2-3 years | <input type="text"/> |
| | 3 years or more | <input type="text"/> |

| | | |
|----------------------------|------------------------|----------------------|
| Level of competing: | Premiership | <input type="text"/> |
| | Division 1 | <input type="text"/> |
| | Division 2 | <input type="text"/> |
| | Division 3 | <input type="text"/> |
| | Other (specify) | <input type="text"/> |

| | | |
|------------------------------------|-------------------------|----------------------|
| Overall experience (years): | Less than 1 year | <input type="text"/> |
| | 1-2 years | <input type="text"/> |
| | 2-5 Years | <input type="text"/> |
| | 5 years or more | <input type="text"/> |

| | | |
|-----------------------------------|------------------------|----------------------|
| Hours of practice per week | 2-4 hours | <input type="text"/> |
| | 4-6 hours | <input type="text"/> |
| | 6-8 hours | <input type="text"/> |
| | 8 hours or more | <input type="text"/> |

Coach-Athlete Relationship Questionnaire-1

Instructions: The questionnaire aims to measure the nature of the athlete-coach relationship. Please read carefully the statements below and circle the answer that indicates whether you agree or disagree. There are no right or wrong answers. Please respond to the statements as honest as possible and relevant to how you personally feel. Your responses are completely confidential – no personal details such as name is required to be identified, thus anonymity is assured.

Please respond to the questionnaire with your principal coach in mind.

| | Strongly Disagree | | | Halfway ↓ | | | Strongly Agree |
|--|----------------------|---|---|--------------|---|---|-------------------|
| 1. I feel close to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I feel committed to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. I like my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. When I am coached by my coach I feel at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I trust my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. I feel that my sport career is promising with my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. When I am coached by my coach, I feel responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I respect my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. When I am coached by my coach, I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. When I am coached by my coach, I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Coach-Athlete Relationship Questionnaire-2

Instructions: This time you need to think how your coach thinks, feels and behaves in relation to you.

| | Strongly | | | | | Strongly | |
|---|----------|---|---------|---|---|----------|---|
| | Disagree | | Halfway | | | Agree | |
| | | | ↓ | | | | |
| 1. My coach feels close to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. My coach is committed to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My coach likes me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. My coach believes that when I am coached by him/her I feel at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. My coach trusts me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. My coach believes that my sport career is promising with him/her. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. My coach believes that when I am coached by him/her, I feel responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. My coach respects me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. My coach believes that when I am coached by him/her I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. My coach believes that when I am coached by him/her I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

The Perceived Motivational Climate in Sport Questionnaire

Instructions: Please think about how it has felt to play on your team throughout this season. What is it usually like on your team? Read each of the following statements carefully and respond to each in terms of how you view the typical atmosphere on your team. Perceptions naturally vary from person to person, so be certain to take your time and answer as honestly as possible. Circle the number that best represents how you feel.

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|----------------------|----------|---------|-------|-------------------|
| On this team: | | | | | |
| 1. the coach wants us to try new skills. | 1 | 2 | 3 | 4 | 5 |
| 2. the coach gets mad when a player makes a mistake. | 1 | 2 | 3 | 4 | 5 |
| 3. the coach gives most of his/her attention to the stars. | 1 | 2 | 3 | 4 | 5 |
| 4. each player contributes in some important way. | 1 | 2 | 3 | 4 | 5 |
| 5. the coach believes that all of us are crucial to the success of the team. | 1 | 2 | 3 | 4 | 5 |
| 6. the coach praises players only when they outplay team-mates. | 1 | 2 | 3 | 4 | 5 |
| 7. the coach thinks only the starters contribute to the success of the team.. | 1 | 2 | 3 | 4 | 5 |
| 8. players feel good when they try their best. | 1 | 2 | 3 | 4 | 5 |
| 9. players are taken out of a game for mistakes. | 1 | 2 | 3 | 4 | 5 |
| 10. players at all skill levels have an important role on the team. | 1 | 2 | 3 | 4 | 5 |
| 11. players help each other learn. | 1 | 2 | 3 | 4 | 5 |
| 12. players are encouraged to outplay the other players. | 1 | 2 | 3 | 4 | 5 |
| 13. the coach has his/her own favourites. | 1 | 2 | 3 | 4 | 5 |
| 14. the coach makes sure players improve on skills they're not good at. | 1 | 2 | 3 | 4 | 5 |
| 15. the coach yells at players for messing up. | 1 | 2 | 3 | 4 | 5 |
| 16. players feel successful when they improve. | 1 | 2 | 3 | 4 | 5 |
| 17. only the players with the best 'stats' get praise. | 1 | 2 | 3 | 4 | 5 |
| 18. players are punished when they make a mistake. | 1 | 2 | 3 | 4 | 5 |
| 19. each player has an important role. | 1 | 2 | 3 | 4 | 5 |
| 20. trying hard is rewarded. | 1 | 2 | 3 | 4 | 5 |
| 21. the coach encourages players to help each other. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|-----|--|---|---|---|---|---|
| 22. | the coach makes it clear who he/she thinks are the best players. | 1 | 2 | 3 | 4 | 5 |
| 23. | players are 'psyched' when they do better than their team-mates in a game. | 1 | 2 | 3 | 4 | 5 |
| 24. | if you want to play in a game you must be one of the best players. | 1 | 2 | 3 | 4 | 5 |
| 25. | the coach emphasises always trying your best. | 1 | 2 | 3 | 4 | 5 |
| 26. | only the top players 'get noticed' by the coach. | 1 | 2 | 3 | 4 | 5 |
| 27. | players are afraid to make mistakes. | 1 | 2 | 3 | 4 | 5 |
| 28. | players are encouraged to work on their weaknesses. | 1 | 2 | 3 | 4 | 5 |
| 29. | the coach favours some players more others. | 1 | 2 | 3 | 4 | 5 |
| 30. | the focus is to improve each game/practice. | 1 | 2 | 3 | 4 | 5 |
| 31. | the players really 'work together' as a team. | 1 | 2 | 3 | 4 | 5 |
| 32. | each player feels as if they are an important team member. | 1 | 2 | 3 | 4 | 5 |
| 33. | the players help each other to get better and excel. | 1 | 2 | 3 | 4 | 5 |

Thank you for your co-operation !

8.4 Appendix 4: Invitation for participation letter in the longitudinal study

School of Sport and Exercise Sciences

Loughborough University

Loughborough

LEICESTERSHIRE

LE11 3TU

15 September 2004

Dear Coach,

I am a doctoral student at Loughborough University. The main objective of my study is to explore players' perceptions regarding important performance factors: coach-athlete communication, coaching styles, satisfaction with training and performance. More importantly this study attempts to understand how and what makes athletes thoughts and views change over a period of time. This study is unique and practically significant. Unique because it involves a research design that is rare in the field of sport sciences, and practically significant because the knowledge generated could readily be used by the coach and the athlete for promoting performance accomplishments. More specifically, it aims to make coaches aware of important psychosocial factors that affect their players' sport performance in different times during a season.

Because of its unique research design, participation involves responding to a single questionnaire three different times in the coming season. The repeated measures are a crucial element of this research, and it will help to explore how the change occurs in perceived psychosocial factors over time and provide further insight into the complex mechanisms underlining such phenomena. The questionnaire will be administered before a training session on the team's training ground. The questionnaire asks your athletes to indicate how much they agree or disagree with a number of statements. There are no right or wrong answers and all responses will be treated in the strictest

confidence. The first questionnaire will be administered upon agreement early in the season, preferably two weeks after the preparation period.

On completion of the data collection and as a minimum “thank you” token, I would be happy to provide you with a written report detailing the main findings for your team across the season, and recommendations that could be used to promote a more successful team.

This is an exciting opportunity and your participation would make this research project possible. I hope you will find time in your busy schedule to participate in this study.

Please don't hesitate to contact me if further information or clarification is required.

Yours faithfully

Alkistis Olympiou

PhD Student

Tel: 01509 22 8450, Mob: 07985437143

Email: A.Olympiou@lboro.ac.uk

8.5 Appendix 5: Questionnaire for study 2

Coach-Athlete Relationship Questionnaire-1

Instructions: The questionnaire aims to measure the nature of the athlete-coach relationship. Please read carefully the statements below and circle the answer that indicates whether you agree or disagree. There are no right or wrong answers. Please respond to the statements as honest as possible and relevant to how you personally feel. Your responses are completely confidential – no personal details such as name is required to be identified, thus anonymity is assured.

Please respond to the questionnaire with your principal coach in mind.

| | | Strongly Disagree | | Halfway | | | Strongly Agree | |
|----|--|----------------------|---|---------|---|---|-------------------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. | I feel close to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I feel committed to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I like my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | When I am coached by my coach I feel at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I trust my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | I feel that my sport career is promising with my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | When I am coached by my coach, I feel responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I respect my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|----|---|---|---|---|---|---|---|---|
| 9. | I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10 | When I am coached by my coach, I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11 | When I am coached by my coach, I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Coach-Athlete Relationship Questionnaire-2

Instructions: This time you need to think how your coach thinks, feels and behaves in relation to you.

Strongly Disagree Halfway Strongly Agree
 ↓

| | | | | | | | | |
|----|---|---|---|---|---|---|---|---|
| 1. | My coach feels close to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | My coach is committed to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | My coach likes me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | My coach believes that when I am coached by him/her I feel at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | My coach trusts me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | My coach believes that my sport career is promising with | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

him/her.

| | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 7. | My coach believes that when I am coached by him/her, I feel responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | My coach respects me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | My coach believes that when I am coached by him/her I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | My coach believes that when I am coached by him/her I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

8.6 Appendix 6: Questionnaire for Study 3a

| |
|---------------------|
| GENERAL INFORMATION |
|---------------------|

Please complete the following general information:

Athlete Details:

1. Please write your initials: _____
2. Date of birth: -- / -- / 19 --
3. How many brothers and sisters do you have: _____ brothers _____ sisters
4. Gender: M F
5. Please specify your nationality: _____
6. Please specify the sport you participate in: _____
7. At what level of sport do you and your team participate in? Tick one box.

| | | |
|--------------|------------|---------------|
| RECREATIONAL | UNIVERSITY | CLUB |
| REGIONAL | NATIONAL | INTERNATIONAL |
8. How many years have you been participating in your sport? _____ YRS _____ MONTHS
9. How many years have you been practicing with this team? _____ YRS _____ MONTHS
10. How many years have you been training with your coach? _____ YRS _____ MONTHS
11. How many hours do you practice per week in this team? _____
12. Please indicate the position you generally play:

PART I: COMMUNICATION

General Instructions: Please read carefully the statements and circle the answer that indicates whether you agree or disagree. There are no right or wrong answers. Please respond to the statements as honest as possible and relevant to how you personally feel.

Please respond to the following statements with your principal coach

| I think: | | Strongly Disagree | Halfway | | | Strongly Agree | | |
|----------|---|----------------------|---------|---|---|-------------------|---|---|
| 1. | I feel close to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I feel committed to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I like my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | When I am coached by my coach I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I trust my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | I feel that my sport career is promising with my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | When I am coached by my coach, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I respect my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | When I am coached by my coach, I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | When I am coached by my coach, I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | |
|-------------------|--------------|----------------|
| Strongly disagree | Halfway ↓ | Strongly agree |
|-------------------|--------------|----------------|

| | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 12. | My coach feels close to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. | My coach is committed to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. | My coach likes me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. | My coach believes that when I am coached by him/her I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. | My coach trusts me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. | My coach believes that my sport career is promising with him/her. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. | My coach believes that when I am coached by him/her, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. | My coach respects me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. | My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 21. | My coach believes that when I am coached by him/her I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 22. | My coach believes that when I am coached by him/her I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| |
|----------------------------|
| PART II: MOTIVATION |
|----------------------------|

| | In this team: | Strongly Disagree | | Halfway | | Strongly Agree |
|-----|--|----------------------|---|---------|---|-------------------|
| 23. | players feel good when they try their best. | 1 | 2 | 3 | 4 | 5 |
| 24. | the coach gets mad when a player makes a mistake. | 1 | 2 | 3 | 4 | 5 |
| 25. | the coach has his/her favourites. | 1 | 2 | 3 | 4 | 5 |
| 26. | each player contributes in some important way. | 1 | 2 | 3 | 4 | 5 |
| 27. | the players are encouraged to work on their weaknesses. | 1 | 2 | 3 | 4 | 5 |
| 28. | players help each other learn. | 1 | 2 | 3 | 4 | 5 |
| 29. | the coach yells at players for messing up. | 1 | 2 | 3 | 4 | 5 |
| 30. | the coach gives most of his/her attention to the 'stars.' | 1 | 2 | 3 | 4 | 5 |
| 31. | each player has an important role. | 1 | 2 | 3 | 4 | 5 |
| 32. | the coach makes sure players improve on skills they're not good at. | 1 | 2 | 3 | 4 | 5 |
| 33. | players feel successful when they improve. | 1 | 2 | 3 | 4 | 5 |
| 34. | players are punished when they make a mistake. | 1 | 2 | 3 | 4 | 5 |
| 35. | the coach favours some players more than others. | 1 | 2 | 3 | 4 | 5 |
| 36. | the coach believes that all of the players are crucial to the success of the team. | 1 | 2 | 3 | 4 | 5 |
| 37. | players are taken out of the game for mistakes. | 1 | 2 | 3 | 4 | 5 |
| 38. | trying hard is rewarded. | 1 | 2 | 3 | 4 | 5 |
| 39. | the coach makes it clear who he/she thinks are the best players. | 1 | 2 | 3 | 4 | 5 |
| 40. | the focus is to improve each game/practice. | 1 | 2 | 3 | 4 | 5 |
| 41. | players at all skill levels have an important role on this team. | 1 | 2 | 3 | 4 | 5 |
| 42. | the coach emphasizes always trying your best. | 1 | 2 | 3 | 4 | 5 |
| 43. | players help each other to get better and excel. | 1 | 2 | 3 | 4 | 5 |
| 44. | players are afraid of making mistakes. | 1 | 2 | 3 | 4 | 5 |
| 45. | only the top players 'get noticed' by the coach. | 1 | 2 | 3 | 4 | 5 |
| 46. | the players really 'work together' as a team. | 1 | 2 | 3 | 4 | 5 |
| 47. | Only the players with the best 'skills' get praised. | 1 | 2 | 3 | 4 | 5 |
| 48. | the coach encourages players to help each other learn. | 1 | 2 | 3 | 4 | 5 |

| <i>Why Do You Practice in Your Sport ?</i> | | Does not Correspond at all | | | Corresponds moderately | | | Corresponds exactly |
|--|---|-------------------------------|---|---|------------------------|---|---|---------------------|
| 49. | For the pleasure I feel in living exciting experiences. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 50. | For the pleasure it gives me to know more about the sport that I practice. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 51. | I used to have good reasons for doing sports but now I am asking myself if I should continue doing it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 52. | For the pleasure of discovering new training techniques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 53. | I don't know anymore; I have the impression that I am incapable of succeeding in this sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 54. | Because it allows me to be well regarded by people that I know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 55. | Because, in my opinion, it is one of the best ways to meet people. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 56. | Because I feel a lot of personal satisfaction while mastering certain difficult training techniques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 57. | Because it is absolutely necessary to do sports if one wants to be in shape. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 58. | For the prestige of being an athlete. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 59. | Because it is one of the best ways I have chosen to develop other aspects of myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 60. | For the pleasure I feel while improving some of my weak points. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 61. | For the excitement I feel when I am really involved in the activity. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 62. | Because I must do sports to feel good about myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 63. | For the satisfaction I experience while I am perfecting my abilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 64. | Because people around me think it is important to be in shape. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 65. | Because it is a good way to learn lots of things which could be useful to me in other areas of my life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 66. | For the intense emotions that I feel while I am doing a sport that I like. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 67. | It is not clear to me anymore; I don't really think my place is in sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|
| 68. | For the pleasure that I feel while executing certain difficult movements. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 69. | Because I would feel bad if I was not taking time to do it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 70. | To show others how good I am at my sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 71. | For the pleasure that I feel while learning training techniques that I have never tried before. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 72. | Because it is one of the best ways to maintain good relationships with my friends. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 73. | Because I like the feeling of being totally immersed in the activity. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 74. | Because I must do sports regularly. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 75. | For the pleasure of discovering new performance strategies. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 76. | I often ask myself I can't seem to achieve the goals that I set for myself. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

When I am with my coach,

| | | Strongly disagree | | Halfway | | | Strongly agree | |
|-----|--|-------------------|---|---------|---|---|----------------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 77. | I feel free to be who I am. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 78. | I feel like a competent athlete. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 79. | I feel cared about. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 80. | I often feel inadequate or incompetent. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 81. | I have a say in what happens and can voice my opinion. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 82. | I often feel a lot of distance in our athletic relationship. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 83. | I feel very capable and effective in sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 84. | I feel a lot of closeness and intimacy | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 85. | I feel controlled and pressured to be certain ways. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Thank you for your co-operation!

8.7 Appendix 7: Questionnaire for Study 3b

GENERAL INFORMATION

Please complete the following general information:

Athlete Details:

1. Please write your initials: _____

2. Date of birth: -- / -- / 19 --

3. How many brothers and sisters do you have: _____ brothers _____ sisters

4. Gender: M F

5. Please specify your nationality: _____

6. Please specify the sport you participate in: _____

7. At what level of sport do you and your team participate in? Tick one box.

RECREATIONAL UNIVERSITY CLUB

REGIONAL NATIONAL INTERNATIONAL

8. How many years have you been participating in your sport? _____ YRS _____ MONTHS

9. How many years have you been practicing with this team? _____ YRS _____ MONTHS

10. How many years have you been training with your coach? _____ YRS _____ MONTHS

11. How many hours do you practice per week in this team? _____

12. Please indicate the position you generally play:

offence

defence

other (please specify) _____

General Instructions: Please read carefully the statements and circle the answer that indicates whether you agree or disagree. There are no right or wrong answers. Please respond to the statements as honest as possible and relevant to how you personally feel.

PART I : COMMUNICATION

Please respond to the following statements with your principal coach

| | | Strongly Disagree | | Halfway | | | Strongly Agree | |
|------|---|----------------------|---|---------|---|---|-------------------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. | I feel close to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I feel committed to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I like my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | When I am coached by my coach I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I trust my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | I feel that my sport career is promising with my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | When I am coached by my coach, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I respect my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10.. | When I am coached by my coach, I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | When I am coached by my coach, I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I think:

| | | |
|-------------------|--------------|----------------|
| Strongly disagree | Halfway ↓ | Strongly agree |
|-------------------|--------------|----------------|

| | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 12. | My coach feels close to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. | My coach is committed to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. | My coach likes me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 15. | My coach believes that when I am coached by him/her I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. | My coach trusts me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 17. | My coach believes that my sport career is promising with him/her. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 18. | My coach believes that when I am coached by him/her, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 19. | My coach respects me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 20. | My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 21. | My coach believes that when I am coached by him/her I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 22. | My coach believes that when I am coached by him/her I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

When I am with my coach,

Strongly

Halfway
↓

Strongly

| | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 23. | I feel free to be who I am. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 24. | I feel like a competent athlete. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 25. | I feel cared about. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 26. | I often feel inadequate or incompetent. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 27. | I have a say in what happens and can voice my opinion. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 28. | I often feel a lot of distance in our athletic relationship. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 29. | I feel very capable and effective in sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 30. | I feel a lot of closeness and intimacy | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 31. | I feel controlled and pressured to be certain ways. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

PART II: MOTIVATION

| In this team: | Strongly Disagree | 2 | 3 | Halfway | 4 | Strongly Agree |
|--|----------------------|---|---|---------|---|-------------------|
| 32. players feel good when they try their best. | 1 | 2 | 3 | 4 | 5 | |
| 33. the coach gets mad when a player makes a mistake. | 1 | 2 | 3 | 4 | 5 | |
| 34. the coach has his/her favourites. | 1 | 2 | 3 | 4 | 5 | |
| 35. each player contributes in some important way. | 1 | 2 | 3 | 4 | 5 | |
| 36. the players are encouraged to work on their weaknesses. | 1 | 2 | 3 | 4 | 5 | |
| 37. players help each other learn. | 1 | 2 | 3 | 4 | 5 | |
| 38. the coach yells at players for messing up. | 1 | 2 | 3 | 4 | 5 | |
| 39. the coach gives most of his/her attention to the 'stars.' | 1 | 2 | 3 | 4 | 5 | |
| 40. each player has an important role. | 1 | 2 | 3 | 4 | 5 | |
| 41. the coach makes sure players improve on skills they're not good at. | 1 | 2 | 3 | 4 | 5 | |
| 42. players feel successful when they improve. | 1 | 2 | 3 | 4 | 5 | |
| 43. players are punished when they make a mistake. | 1 | 2 | 3 | 4 | 5 | |
| 44. the coach favours some players more than others. | 1 | 2 | 3 | 4 | 5 | |
| 45. the coach believes that all of the players are crucial to the success of the team. | 1 | 2 | 3 | 4 | 5 | |
| 46. players are taken out of the game for mistakes. | 1 | 2 | 3 | 4 | 5 | |
| 47. trying hard is rewarded. | 1 | 2 | 3 | 4 | 5 | |
| 48. the coach makes it clear who he/she thinks are the best players. | 1 | 2 | 3 | 4 | 5 | |
| 49. the focus is to improve each game/practice. | 1 | 2 | 3 | 4 | 5 | |
| 50. players at all skill levels have an important role on this team. | 1 | 2 | 3 | 4 | 5 | |
| 51. the coach emphasizes always trying your best. | 1 | 2 | 3 | 4 | 5 | |
| 52. players help each other to get better and excel. | 1 | 2 | 3 | 4 | 5 | |
| 53. players are afraid of making mistakes. | 1 | 2 | 3 | 4 | 5 | |
| 54. only the top players 'get noticed' by the coach. | 1 | 2 | 3 | 4 | 5 | |
| 55. the players really 'work together' as a team. | 1 | 2 | 3 | 4 | 5 | |
| 56. Only the players with the best 'skills' get praised. | 1 | 2 | 3 | 4 | 5 | |
| 57. the coach encourages players to help each other learn. | 1 | 2 | 3 | 4 | 5 | |

**In your view, how clear are your roles
and responsibilities in your team?**

Strongly
disagree

Halfway
↓

Strongly
agree

| | | | | | | | | | | |
|----|---|---|---|---|---|---|---|---|---|---|
| 58 | I understand the extent of my responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 59 | I understand what adjustments to my behaviour need to be made to carry out my role. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 60 | I understand the criteria by which my role responsibilities are evaluated. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 61 | It is clear to me what happens if I fail to carry out my role responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 62 | I understand the scope of my responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 63 | I know what behaviours are necessary to carry out my responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 64 | I am clear about the different responsibilities that make up my role. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 65 | I understand how my role is evaluated. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 66 | I understand the consequences of unsuccessful role performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 67 | It is clear what behaviours I should perform to fulfil my role. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 68 | It is clear to me how my role responsibilities are evaluated. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 69 | I know what will happen if I don't perform my role responsibilities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Thank you for your co-operation!

8.8 Appendix 8: Questionnaire for Study 3c

GENERAL INFORMATION

Please complete the following general information:

Athlete Details:

1. Please write your initials: _____

2. Date of birth: -- / -- / 19 --

3. How many brothers and sisters do you have: _____ brothers _____ sisters

4. Gender: M F

5. Please specify your nationality: _____

6. Please specify the sport you participate in: _____

7. At what level of sport do you and your team participate in? Tick one box.

RECREATIONAL

UNIVERSITY

CLUB

REGIONAL

NATIONAL

INTERNATIONAL

8. How many years have you been participating in your sport? _____ YRS _____ MONTHS

9. How many years have you been practicing with this team? _____ YRS _____ MONTHS

10. How many years have you been training with your coach? _____ YRS _____ MONTHS

11. How many hours do you practice per week in this team? _____

12. Please indicate the position you generally play:

offence

defence

other (please specify) _____

General Instructions: Please read carefully the statements and circle the answer that indicates whether you agree or disagree. There are no right or wrong answers. Please respond to the statements as honest as possible and relevant to how you personally feel.

When I am with my coach,

| | | Strongly disagree | | Halfway ↓ | | | Strongly agree | |
|----|--|-------------------|---|--------------|---|---|----------------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. | I feel free to be who I am. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | I feel like a competent athlete. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | I feel cared about. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | I often feel inadequate or incompetent. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I have a say in what happens and can voice my opinion. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | I often feel a lot of distance in our athletic relationship. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | I feel very capable and effective in sport. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I feel a lot of closeness and intimacy | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | I feel controlled and pressured to be certain ways. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| In this team: | | Strongly Disagree | | Halfway ↓ | | Strongly Agree |
|----------------------|--|-------------------|---|--------------|---|----------------|
| 10. | players feel good when they try their best. | 1 | 2 | 3 | 4 | 5 |
| 11. | the coach gets mad when a player makes a mistake. | 1 | 2 | 3 | 4 | 5 |
| 12. | the coach has his/her favourites. | 1 | 2 | 3 | 4 | 5 |
| 13. | each player contributes in some important way. | 1 | 2 | 3 | 4 | 5 |
| 14. | the players are encouraged to work on their weaknesses. | 1 | 2 | 3 | 4 | 5 |
| 15. | players help each other learn. | 1 | 2 | 3 | 4 | 5 |
| 16. | the coach yells at players for messing up. | 1 | 2 | 3 | 4 | 5 |
| 17. | the coach gives most of his/her attention to the 'stars.' | 1 | 2 | 3 | 4 | 5 |
| 18. | each player has an important role. | 1 | 2 | 3 | 4 | 5 |
| 19. | the coach makes sure players improve on skills they're not good at. | 1 | 2 | 3 | 4 | 5 |
| 20. | players feel successful when they improve. | 1 | 2 | 3 | 4 | 5 |
| 21. | players are punished when they make a mistake. | 1 | 2 | 3 | 4 | 5 |
| 22. | the coach favours some players more than others. | 1 | 2 | 3 | 4 | 5 |
| 23. | the coach believes that all of the players are crucial to the success of the team. | 1 | 2 | 3 | 4 | 5 |
| 24. | players are taken out of the game for mistakes. | 1 | 2 | 3 | 4 | 5 |
| 25. | trying hard is rewarded. | 1 | 2 | 3 | 4 | 5 |
| 26. | the coach makes it clear who he/she thinks are the best players. | 1 | 2 | 3 | 4 | 5 |
| 27. | the focus is to improve each game/practice. | 1 | 2 | 3 | 4 | 5 |
| 28. | players at all skill levels have an important role on this team. | 1 | 2 | 3 | 4 | 5 |
| 29. | the coach emphasizes always trying your best. | 1 | 2 | 3 | 4 | 5 |
| 30. | players help each other to get better and excel. | 1 | 2 | 3 | 4 | 5 |
| 31. | players are afraid of making mistakes. | 1 | 2 | 3 | 4 | 5 |
| 32. | only the top players 'get noticed' by the coach. | 1 | 2 | 3 | 4 | 5 |
| 33. | the players really 'work together' as a team. | 1 | 2 | 3 | 4 | 5 |
| 34. | Only the players with the best 'skills' get praised. | 1 | 2 | 3 | 4 | 5 |
| 35. | the coach encourages players to help each other learn. | 1 | 2 | 3 | 4 | 5 |

Please respond to the following statements with your principal coach

| | | Strongly Disagree | | | Halfway | | | Strongly Agree |
|------|---|-------------------|---|---|---------|---|---|----------------|
| 36. | I feel close to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 37. | I feel committed to my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 38. | I like my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 39. | When I am coached by my coach I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 40. | I trust my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 41. | I feel that my sport career is promising with my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 42. | When I am coached by my coach, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 43. | I respect my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 44.. | I feel appreciation for the sacrifices my coach has experienced in order to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 45. | When I am coached by my coach, I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 46. | When I am coached by my coach, I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| I think: | | Strongly disagree | | | | | | | Halfway | | | | | | | Strongly agree | | | | | | |
|----------|--|-------------------|---|---|---|---|---|---|---------|---|---|---|---|---|---|----------------|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 47. | My coach feels close to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 48. | My coach is committed to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 49. | My coach likes me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 50. | My coach believes that when I am coached by him/her I am at ease. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 51. | My coach trusts me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 52. | My coach believes that my sport career is promising with him/her. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 53. | My coach believes that when I am coached by him/her, I am responsive to his/her efforts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 54. | My coach respects me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 55. | My coach believes that I am appreciative for the sacrifices that he/she has experienced to improve my performance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 56. | My coach believes that when I am coached by him/her I am ready to do my best. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 57. | My coach believes that when I am coached by him/her I adopt a friendly stance. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

During your last few matches to what extent did you....

Not at all

Somewhat

A lot

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 58. keep to a strategy | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 59. keep a consistent standard | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 60. use effective strategies | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 61. plan each point/situation | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 62. employ good tactics | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 63. feel good | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 64. adapt to changing circumstances | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 65. keep up the pressure on your opponents | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 66. keep your mind on the present | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 67. play tactically well | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 68. use breaks to prepare for the next period of play | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 69. stay focused but relaxed | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I am satisfied with:

| | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|
| 70. | the recognition I receive from my coach. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 71. | the friendliness of the coach towards me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 72. | the level of appreciation my coach shows when I do well. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 73. | my coach's loyalty towards me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 74. | the extent to which my coach is behind me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 75. | the degree of which I have reached my performance goals this season. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 76. | the improvement in my performance over the previous season. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 77. | the improvement in my skill level thus far. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 78. | the team's win/loss record this season. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 79. | the team's overall performance this season. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 80. | the extent to which the team has met its goals for the season thus far. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Thank you for your co-operation!

8.9 Appendix 9: Ethical Clearance Checklist for Studies 2 and 3.

BEST COPY

AVAILABLE

Variable print quality

Ethical Clearance Checklist

(TO BE COMPLETED FOR ALL INVESTIGATIONS INVOLVING HUMAN PARTICIPANTS)

All staff wishing to conduct an investigation involving human participants in order to collect new data in either their research or teaching activities, and supervisors of students who wish to employ such techniques are required to complete this checklist before commencement. It may be necessary upon completion of this checklist for investigators to submit a full application to the Ethical Advisory Committee. Where necessary, official approval from the Ethical Advisory Committee should be obtained *before* the research is commenced. This should take no longer than one month.

IF YOUR RESEARCH IS BEING CONDUCTED OFF CAMPUS AND ETHICAL APPROVAL FOR YOUR STUDY HAS BEEN GRANTED BY AN EXTERNAL ETHICS COMMITTEE, YOU MAY NOT NEED TO SEEK FULL APPROVAL FROM THE UNIVERSITY ETHICAL ADVISORY COMMITTEE. HOWEVER, YOU WILL BE EXPECTED TO PROVIDE EVIDENCE OF APPROVAL FROM THE EXTERNAL ETHICS COMMITTEE AND THE TERMS ON WHICH THIS APPROVAL HAS BEEN GRANTED. If you believe this statement applies to your research, please contact the Secretary of the Ethical Advisory Committee for confirmation.

IF YOUR RESEARCH IS TRANSFERRING INTO LOUGHBOROUGH UNIVERISITY AND APPROVAL WAS OBTAINED FROM YOUR ORIGINATING INSTITUTION, THERE IS A REQUIREMENT ON THE UNIVERSITY TO ENSURE THAT APPROPRIATE APPROVALS ARE IN PLACE. If you believe this statement applies to your research, please contact the Secretary of the Ethical Advisory Committee with evidence of former approval and the terms on which this approval has been granted.

IT IS THE RESPONSIBILITY OF INDIVIDUAL INVESTIGATORS TO ENSURE THAT THERE IS APPROPRIATE INSURANCE COVER FOR THEIR INVESTIGATION. If you are at all unsure about whether or not your study is covered, please contact the Finance Office to check.

Name and Status of Senior Investigators (Research Grade II and above):

(Please underline responsible investigator where appropriate)

Jowett Sophia (supervisor).....

Olympiou Alkistis (researcher).....

Department SCHOOL OF SPORT AND EXERCISE SCIENCES.....

Name and Status of Other Investigators:

.....
.....

Department.....

Title of Investigation

LONGITUDINAL STUDY OF FACTORS AFFECTING ATHLETE'S PERFORMANCE
IN TEAM SPORTS

.....

Section A: Investigators

Do investigators have previous experience of, and/or adequate training in, the methods employed?

Will junior researchers/students be under the direct supervision of an experienced member of staff?

Will junior researchers/students be expected to undertake physically invasive procedures (not covered by a generic protocol) during the course of the research?

Are researchers in a position of direct authority with regard to participants (eg academic staff using student participants, sports coaches using his/her athletes in training)?

| | |
|-----|----|
| Yes | |
| Yes | |
| | No |
| | No |

**** If you ONLY select answers marked **, please submit your completed Ethical Advisory Checklist accompanied by a statement covering how you intend to manage the issues (indicated by selecting a ** answer) to the Ethical Advisory Committee.**

Section B: Participants

Vulnerable Groups

Will participants be knowingly recruited from one or more of the following vulnerable groups?

Children under 18 years of age (please refer to published guidelines)

People over 65 years of age

Pregnant women

People with mental illness

Prisoners/Detained persons

Other vulnerable group (please specify _____)

| | |
|--|----|
| | No |
| | No |
| | No |
| | No |
| | No |
| | No |

*** Please submit a full application to the Ethical Advisory Committee.**

Chaperoning Participants

If appropriate, eg studies which involve vulnerable participants, taking physical measures or intrusion of participants' privacy:

Will participants be chaperoned by more than one investigator at all times?

Will at least one investigator of the same sex as the participant(s) be present throughout the investigation?

Will participants be visited at home?

| | | |
|-----|----|-----|
| Yes | | N/A |
| Yes | | N/A |
| | No | N/A |

* Please submit a full application to the Ethical Advisory Committee.

If you have selected N/A please provide a statement in the space below explaining why the chaperoning arrangements are not applicable to your research proposal:

Advice to Participants following the investigation

Investigators have a duty of care to participants. When planning research, investigators should consider what, if any, arrangements are needed to inform participants (or those legally responsible for the participants) of any health related (or other) problems previously unrecognised in the participant. This is particularly important if it is believed that by not doing so the participants well being is endangered. Investigators should consider whether or not it is appropriate to recommend that participants (or those legally responsible for the participants) seek qualified professional advice, but should not offer this advice personally. Investigators should familiarise themselves with the guidelines of professional bodies associated with their research.

Section C: Methodology/Procedures

To the best of your knowledge, please indicate whether the proposed study:

Involves taking bodily samples

Involves procedures which are likely to cause physical, psychological, social or emotional distress to participants

Is designed to be challenging physically or psychologically in any way (includes any study involving physical exercise)

Exposes participants to risks or distress greater than those encountered in their normal lifestyle

Prescribes intake of compounds additional to daily diet or other dietary manipulation/supplementation

Involves testing new equipment

Involves pharmaceutical drugs (please refer to published guidelines)

| | |
|---|----|
| Yes <input checked="" type="checkbox"/> | No |
| | No |
| | No |
| | No |
| | No |
| | No |
| | No |

Involves use of radiation (eg x-rays) (please refer to published guidelines)

| | |
|--|----|
| | No |
| | No |
| | No |
| | No |
| | No |

Involves use of hazardous materials (please refer to published guidelines)

Assists/alters the process of conception in any way

Involves methods of contraception

Involves genetic engineering

* Please submit a full application to the Ethical Advisory Committee

† If the procedure is covered by an existing generic protocol, please insert reference number here ____
If the procedure is not covered by an existing generic protocol, please submit a full application to the Ethical Advisory Committee.

Section D: Observation/Recording

Does the study involve observation and/or recording of participants? If yes please complete the rest of section D.

| | |
|-----|-----|
| | No |
| Yes | No* |

Will those being observed and/or recorded be informed that the observation and/or recording will take place?

* Please submit a full application to the Ethical Advisory Committee

Section E: Consent and Deception

Will participants give informed consent[<] freely?

| | |
|-----|--|
| Yes | |
|-----|--|

If yes please complete the **Informed Consent** section below.

*If no, please submit a full application to the Ethical Advisory Committee.

[<] Note: where it is impractical to gain individual consent from every participant, it is acceptable to allow individual participants to "opt out" rather than "opt in".

Informed Consent

Will participants be fully informed of the objectives of the investigation and all details disclosed (preferably at the start of the study but where this would interfere with the study, at the end)?

| | |
|-----|--|
| Yes | |
| Yes | |

Will participants be fully informed of the use of the data collected (including, where applicable, any intellectual property arising from the research)?

For children under the age of 18 or participants who have impairment of understanding or communication:

- will consent be obtained (either in writing or by some other means)?
- will consent be obtained from parents or other suitable person?
- will they be informed that they have the right to withdraw regardless of parental/ guardian consent?

| | | |
|-----|-----|-----|
| Yes | No* | N/A |
| Yes | No* | N/A |
| Yes | No* | N/A |
| Yes | No* | N/A |
| Yes | No* | N/A |

For investigations conducted in schools, will approval be gained in advance from the Head-teacher and/or the Director of Education of the appropriate Local Education Authority?

For detained persons, members of the armed forces, employees, students and other persons judged to be under duress, will care be taken over gaining freely informed consent?

* Please submit a full application to the Ethical Advisory Committee

Does the study involve deception of participants (ie withholding of information or the misleading of participants) which could potentially harm or exploit participants?

| | |
|--|----|
| | No |
|--|----|

If yes please complete the *Deception* section below.

Deception

Is deception an unavoidable part of the study?

| | |
|-----|-----|
| Yes | No* |
|-----|-----|

Will participants be de-briefed and the true object of the research revealed at the earliest stage upon completion of the study?

| | |
|-----|-----|
| Yes | No* |
|-----|-----|

Has consideration been given on the way that participants will react to the withholding of information or deliberate deception?

| | |
|-----|-----|
| Yes | No* |
|-----|-----|

* Please submit a full application to the Ethical Advisory Committee

Section F: Withdrawal

Will participants be informed of their right to withdraw from the investigation at any time and to require their own data to be destroyed?

| | |
|-----|--|
| Yes | |
|-----|--|

* Please submit a full application to the Ethical Advisory Committee

Section G: Storage of Data and Confidentiality

Please see University guidance on [Data Collection and Storage](#).

Will all information on participants be treated as confidential and not identifiable unless agreed otherwise in advance, and subject to the requirements of law?

| | |
|-----|--------------------------|
| Yes | <input type="checkbox"/> |
|-----|--------------------------|

Will storage of data comply with the Data Protection Act 1998? (Please refer to published guidelines)

| | |
|-----|--------------------------|
| Yes | <input type="checkbox"/> |
|-----|--------------------------|

Will any video/audio recording of participants be kept in a secure place and not released for use by third parties?

| | |
|-----|--------------------------|
| Yes | <input type="checkbox"/> |
|-----|--------------------------|

Will video/audio recordings be destroyed within six years of the completion of the investigation?

| | |
|-----|--------------------------|
| Yes | <input type="checkbox"/> |
|-----|--------------------------|

* Please submit a full application to the Ethical Advisory Committee

Section H: Incentives

Have incentives (other than those contractually agreed, salaries or basic expenses) been offered to the investigator to conduct the investigation?

| | |
|--------------------------|----|
| <input type="checkbox"/> | No |
|--------------------------|----|

Will incentives (other than basic expenses) be offered to potential participants as an inducement to participate in the investigation?

| | |
|--------------------------|----|
| <input type="checkbox"/> | No |
|--------------------------|----|

** If you ONLY select answers marked **, please submit your completed Ethical Advisory Checklist accompanied by a statement covering how you intend to manage the issues (indicated by selecting a ** answer) to the Ethical Advisory Committee.

Compliance with Ethical Principles

If you have completed the checklist to the best of your knowledge without selecting an answer marked with * or † your investigation is deemed to conform with the ethical checkpoints and you do not need to seek formal approval from the University's Ethical Advisory Committee.

Please sign the declaration below, and lodge the completed checklist with your Head of Department or his/her nominee.

Declaration

I have read the University's Code of Practice on Investigations on Human Participants. I confirm that the above named investigation complies with published codes of conduct, ethical principles and guidelines of professional bodies associated with my research discipline.

Signature of Responsible Investigator

[Handwritten Signature]

Signature of Student (if appropriate)

[Handwritten Signature]

Signature of Head of Department or his/her nominee

[Handwritten Signature]

If the provision for Compliance with Ethical Principles does not apply, please proceed to the Guidance from Ethical Advisory Committee section below.

Guidance from Ethical Advisory Committee

If, upon completion of the checklist you have ONLY selected answers marked **, please submit your completed Ethical Advisory Checklist accompanied by a statement covering how you intend to manage the issues (indicated by selecting a ** answer) to the Ethical Advisory Committee.

If, upon completion of the checklist, you have selected an answer marked with * or † it is possible that an aspect of the proposed investigation does not conform to the ethical principles adopted by the University. Therefore you are requested to complete a full submission to the Ethical Advisory Committee. You should aim to complete the entire form in brief but need only provide specific detail on the questions which relate directly to the issues for which you have selected an answer marked * or † on the checklist. A copy of this checklist, signed by your Head of Department should accompany the full submission to the Ethical Advisory Committee. Please contact the Secretary if you have any queries about completion of the form. The relevant application form can be downloaded from the Committee's web page.

Signature of Responsible Investigator

Stewart

Signature of Student (if appropriate)

Olympic

Signature of Head of Department or his/her nominee

Biddle

12 NOV 2003

Date

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