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**Ability Beliefs, Achievement Goals, and Intrinsic Motivation  
in Physical Education**

**by**

**C. K. John Wang**

**A Doctoral Thesis**

**Submitted in partial fulfilment of the requirements for the  
award of Doctor of Philosophy of Loughborough University**

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## ABSTRACT

This thesis examined the relationships of the conceptions of sport ability, achievement goals, and intrinsic motivation in Physical Education. Studies 1 and 2 investigated the psychometric properties of the Conceptions of the Nature of Athletic Ability Questionnaire (CNAAQ), a measure of sport ability beliefs. Results showed that the revised version of the scale possesses sound psychometric properties in assessing sport ability beliefs among children and youth. In addition, the relationships between ability beliefs, goal orientations, perceived competence, and behavioural indicators (intentions and amotivation) were also examined in the first two studies. An incremental belief predicted task orientation, whereas an entity belief predicted ego orientation. Intentions to be physically active were predicted by goal orientations indirectly through perceived competence, and directly by task orientation. In addition, amotivation was predicted directly and indirectly by ability beliefs and directly by achievement goals. Specifically, entity beliefs directly predicted amotivation, task orientation negatively predicted amotivation. Study 3 examined the interrelationships between ability beliefs, achievement goals, perceived competence, behavioural regulation, and amotivation using cluster analysis. Five distinct clusters were identified based on these motivational constructs and these profiles were found to be related to perceived physical self-worth and levels of sport participation. Study 4 experimentally manipulated sport ability beliefs and examined their causal influence on achievement goals and motivation patterns when faced with failure. The causal link between ability beliefs and goals was supported. Ability attributions for failure were stronger for entity theorists compared to incremental theorists. However, hypotheses predicting differences on effort attributions, affective reactions, and behavioural markers were not supported. Study 5 examined the effects of goal involvement on enjoyment and intrinsic motivation under positive feedback. The results suggested that task-involved and ego-involved participants did not differ in self-reported enjoyment and free-choice behaviour measure. However, the free-choice behaviour of the ego-involved participants may not be fully intrinsically motivated. In addition, autonomous communication increased the positive effects of task and ego involvement on intrinsic motivation and enjoyment, whereas controlling communication had an undermining effect. Overall, results show that high incremental beliefs and high task orientation facilitate adaptive motivational patterns. Autonomy-supportive contexts also enhanced students' task motivation compared to controlling contexts.



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# CHAPTER I

## Introduction

### 1.1 The Benefits of Regular Physical Activity

The health benefits of regular physical activity for adults have been widely studied and there is enough evidence to suggest that regular physical exercise increases the functional capacity and reduces the risk factors of many chronic diseases, including coronary heart disease, high blood cholesterol, hypertension, obesity, cardiovascular diseases, colon cancer and diabetes mellitus (Bouchard, Shephard, & Stephens, 1994; Leon, 1997; McGinnis, 1992; Pate et al., 1995; Powell, Caspersen, Koplan, & Ford, 1989). Recent evidence indicates that physical activity of moderate intensity reduces depression and anxiety, improves mood, and enhances quality of life throughout the life span (Berger & Owen, 1992; Biddle, Fox, & Boutcher, 2000; Raglin, 1990). In many countries, the promotion of physical activity has been included in the national agenda, which is evidenced by a number of national initiatives. For example, the “Healthy People 2000” in the US, “Finland on the Move” in Finland, “Strategy Statement on Physical Activity” in the United Kingdom, all of which aim to encourage more people to be physically active to improve their health.

Compared to the adult population, physical activity in young people is not as clearly understood. Divergent viewpoints have been expressed about physical activity among young people in terms of tracking into adulthood, or its long-term benefits for prevention of chronic heart disease (Kemper, Post, Twist, & Van Mechelen, 1999; Pate et al., 1999; C. L. Williams, 1994). While further research is required to provide more conclusive evidence, there is widespread consensus that regular participation in physical activity is beneficial to children and adolescents, at least in terms of short-term health. It is documented that the benefits of regular physical activity in young people include areas such as cardiovascular fitness, psychological health, skeletal health, blood pressure, body composition, as well as glucose, insulin, and blood lipids (Biddle, Sallis, & Cavill, 1998; Health Education Authority, 1997; Sallis, 1994). The strong justification of the need for physical activity promotion among young people



leads to prescriptions of the amount of physical activity necessary to gain maximum health benefits (Health Education Authority, 1997; Sallis, 1994; Pate et al., 1995). The current recommendation in the United Kingdom is for young people to participate in an hour of moderate physical activity on most days of the week (Biddle et al., 1998).

## **1.2 Physical Education in Schools**

In the light of the aforementioned background, Physical Education (PE) in schools is seen as a vital place where young people can be encouraged to participate in physical activity to promote their health and well-being (Cale, 2000). One reason for this is that PE provides an existing organisational structure and opportunities to reach almost all school-aged children (5-16 years). Within such a 'captive audience', descriptive research has established that some young people are highly motivated towards PE, whilst others view PE negatively, and as a source of stress (Goudas & Biddle, 1993; Van Wersch, Trew & Turner, 1992). In addition, physical activity declines through adolescence, and girls are less active than boys (Armstrong, 1989; Division of Physical and Health Education, 1989). More surprisingly, many young people in the United Kingdom do not participate in sufficient regular physical activity to gain potential health benefits (Armstrong & McManus, 1994; Cale & Almond, 1992; Trew, Scully, Kremer, & Ogle, 1999).

Descriptive studies are useful, but they do not offer insight for advancing our understanding of explanations of motivational processes. For this reason, it is important to use a theoretical approach in the study of young people's motivation for participation in PE, and to determine the factors influencing the decision-making processes of motivated behaviour. Psychological research in PE can shed light on the understanding of students' behaviour, as well as provide useful guidelines to practitioners including physical educators, health promoters, and sports development officers.



Motivation is the most important construct studied in psychology as it represents the 'why' question of behaviour (Deci & Ryan, 1985). Maehr and Braskamp (1986) define motivation with five behavioural patterns. They are direction (choice and decision making), persistence (effort and trying hard), continuing motivation (persistence over time), intensity (trying hard), and performance (outcomes). This shows that the study of motivation can be complex and diverse, and can be approached from different theoretical perspectives (Biddle, 1999).

Over the last few decades, the study of human motivation has shifted from utilising a mechanistic perspective, such as drive theory and gestalt theories of motivation, to a more complex social cognitive approach, such as self-efficacy theory, self-determination theory and achievement goal theory (Biddle, 1997). In the social cognitive approach, human beings are assumed to think about and evaluate their actions, often in a rational manner (Bandura, 1986). It is argued that these self-based theories of motivation are useful in explaining human action (Biddle, 1997). However, very limited research has been carried out to test motivation theories in the context of PE (Biddle, 1994).

Against this background, the purpose of the present research was to examine the achievement motivation of young people in PE using a social cognitive approach. Specifically, achievement goal (Dweck & Leggett, 1988; Nicholls, 1984; 1989), implicit theories of ability (Dweck, 1999; Dweck & Leggett, 1988), and self-determination theory (Deci & Ryan, 1985) will be used as the underpinning framework of this thesis. Achievement goal approach has received widespread attention in the study of motivation in young people and children (Biddle, 1999), and has been successful in explaining and predicting beliefs, affect, responses and behaviour in achievement settings. However, most research has been conducted in competitive sport settings rather than PE contexts (e.g. Duda, 1989; Duda, Chi, Newton, Walling, & Catley, 1995; Duda & Nicholls, 1992).

The major theoretical tenet of achievement goal theory is that individuals strive to demonstrate ability and to avoid displaying incompetence in an achievement context. Thus, individuals are assumed to differentially endorse two different and

subjective ways of defining success and failure, and judging their competence (Nicholls, 1989). These two conceptions result in at least two goal involvement states. A task-involved person tends to define success or judge his or her competence in a self-referenced manner, based on self-improvement or investing effort in task mastery. On the other hand, an ego-involved person defines success in a normative fashion. Here, one aims to outperform others or to win with less effort.

It has been suggested that task or ego involvement may be determined by dispositional orientations (Nicholls, 1989). Consequently, the constructs of task and ego orientations have been used to reflect the tendency of an individual to be task- and/or ego-involved. It has been found that task-oriented individuals, regardless of levels of perceived competence, exhibit positive, or adaptive, motivated behaviour. Similarly, ego-involved individuals with high perceived competence should also have adaptive motivational patterns (Dweck, 1986; Nicholls, 1984; 1989). However, ego-oriented people with low perceived competence are likely to be motivationally fragile and to exhibit maladaptive motivational responses.

According to Dweck and her colleagues (Dweck, 1999; Dweck & Leggett, 1988; Hong, Chiu, & Dweck 1995), two clusters of beliefs underpin people's judgement and actions in achievement contexts. These two beliefs centre on the way people view the malleability of attributes, such as intelligence. An entity belief is when a particular attribute is viewed as fixed and relatively stable, whereas an incremental theory views the attribute as changeable and open to development. Classroom research has shown that individuals holding entity beliefs are more likely to have negative reactions, such as helplessness, when faced with setbacks (Dweck & Leggett, 1988), as compared to the incremental theorists. Entity theorists are also more likely to endorse performance (ego) goals, while incremental theorists tend to endorse mastery (task) goals. Nonetheless, little is known about how such beliefs operate in the physical activity domain.

Looking at self-conception of ability or belief is useful in understanding human motivation but may be incomplete because the individual's psychological needs have been ignored. According to self-determination theory, people are active

organisms seeking to master their internal and external environment (Deci & Ryan, 1985, 1987; Ryan & Deci, 2000a, 2000b). In particular, three psychological needs have been identified to foster this self-motivated process. They are the needs for competence, relatedness, and autonomy. Research in self-determination theory has examined the influence of external events, as well as intrapersonal events, that facilitates or undermines self-motivation or self-regulation of behaviour. In general, it has been shown that conditions that allow satisfaction of the three psychological needs enhance intrinsic motivation, whereas conditions that frustrate these needs undermine intrinsic motivation.

The three major theories outlined above have been shown to explain a substantial amount of variance in human behaviour and experience in classroom and sport domains. However, research in PE settings has been sparse. The aim of the present thesis is not to study each theory in isolation, but to explore the roles and relationships between achievement goals, ability beliefs and intrinsic motivation. It is hoped that this broader framework will help in our understanding of the determinants of physical activity in young people, and in gaining valuable information for promoting physical activity in PE contexts. At the same time, such psychological research in PE can help in the advancement of psychological theories. In addition, the scientific enquiry can generate further questions to stimulate future research.

### **1.3 Overview of the Thesis**

In the next chapter, the relevant literature concerning achievement goal theory, implicit theories, and self-determination theory is reviewed, followed by an outline of research questions to be examined. The subsequent five chapters describe the five studies undertaken to examine these questions. Finally, the last chapter summarises the main findings of the studies, and discusses the findings in terms of their theoretical importance, as well as practical implications for the practice of PE.



## CHAPTER II

### Review of Literature

#### 2.1 Introduction

What energises and directs human behaviour? This has been the key question in guiding the study of motivation since the evolution of motivational research. In an attempt to answer this question, many motivational theories have been proposed with accompanying assumptions about the nature of humans and about the factors that motivate behaviours. As a result, the explanations of human behaviour are diverse but no single theory has yet to claim the ability to explain motivated behaviour in its entirety (Roberts, 1992). Modern approaches are beginning to pull together different aspects of motivational research in order to understand motivated behaviour. This new trend is in stark contrast with earlier methods and theories.

Initially, the mechanistic approach such as Hull's (1943) drive theory and Freud's (1933/1964) psychoanalytic theory dominated the field of psychology for many years until the mid-1950s (Weiner, 1992). This approach views humans as passive and motivated by psychological drives. Motivated behaviour is equated with striving for equilibrium or homeostasis. Humans are seen as logical information processing systems who respond to stimuli in a predicted fashion. This is described as the "machine-like" metaphor of human behaviour by Weiner (1992). However, it became increasingly clear that these theories were not adequate for dealing with the complexities of human behaviour. For example, the approach was criticised for the inability to explain aspects of behaviour related to play, exploration and those that do not follow the stimulus-response hypotheses of the mechanistic theories.

Over the years the mechanistic approach faded in popularity, the motivation literature has shown a shift towards cognitive theories. The cognitive approach views motivation as a cognitive phenomenon and, from this perspective, humans are seen to have complete rationality in making fully informed choices. This is what Weiner

(1992) described as the “god-like” metaphor. Essentially, cognitive theorists assume that thoughts govern action, and they attempt to understand how individuals think and how their actions are regulated. Need achievement theory (Atkinson, 1957; 1958; McClelland, 1961) and attribution theory (Weiner, 1972) are examples of such an approach. However, these theories also suffer from various shortcomings. For example, critiques of need achievement theory centred on the measurement of motive through the use of projective tests (e.g., Thematic Apperception Test, Entwisle, 1972) and its lack of predictive power (Dweck, 1999). Attribution theory, on the other hand, has been criticised for not addressing value in a systematic way and for being narrow in its focus (Roberts, 1992).

Building on past cognitive theories, a new social cognitive approach has emerged, and has dominated the study of motivation for the last twenty years. In the social cognitive approach, human beings are seen as actively processing events (internal and external) and developing expectations regarding future consequences, rather than automatically behaving in response to external stimuli (Bandura, 1986). In this process, human beings may not always be rational in making decisions and may not have full information-processing capability (Biddle, 1997). The “god-like” metaphor is therefore extended to a “person as judge” metaphor (Weiner, 1992).

The study of motivation has moved away from the mechanistic approach in which cognitive processes are totally ignored on the one hand, and the cognitive paradigm which focuses on internal thoughts and states on the other hand, to the emphasis on the role of the social environment in affecting cognitions. Dweck (1986) stated that “the social cognitive approach has allowed us to a) characterise adaptive and maladaptive patterns, b) explain them in terms of specific underlying processes, and thus c) begin to provide a rigorous conceptual and empirical basis for intervention and practice” (p. 1040). Under the conceptual umbrella of the social cognitive approach, one of the major theories commonly utilised in achievement motivation research is achievement goals theory (Ames, 1992a, 1992b; Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1989). Before discussing the major theoretical tenets underlying achievement goal, different approaches to investigations of goals will be outlined.



## 2.2 Types of Goals in Achievement Contexts

Goals are widely recognised as central to the understanding of motivated behaviour. Individuals may hold multiple goals in achievement contexts (Dweck, 1986; Nicholls, 1989) and these goals may be hierarchically organised and focus on different content (Brett & Vandewalle, 1999). There are at least three general perspectives on goals in the literature identified by Pintrich (2000) and these deserve some comments.

When an individual sets goals for engaging in a particular task or activity, this type of goal is identified as a 'target goal' (Harackiewicz & Sansone, 1991). These target goals reflect what the individual aims to achieve and how performance is evaluated. For example, a basketball player practising free throws might set a target of trying to get 7 out of 10 balls in the basket. This level of goals focuses on a performance standard to be reached but does not deal with why the target goals are set in the first place.

The second level of goals, labelled as a 'content goal', is at a more global level and reflects not just target goals but also the reasons for engaging in a particular behaviour. Ford (1992) identified 24 basic categories of goals in his motivational systems taxonomy such as social goals, mastery, creativity, happiness, and belonging. This goal content approach is considered as general because it is applicable to all areas of life and not just achievement settings (Pintrich, 2000). It is assumed that individuals are likely to pursue multiple goals and thus examining the content of these goals can provide a better understanding of motivated behaviour (Wentzel, 2000). For example, students are expected to behave themselves, pay attention in class, cooperate with others, do their homework, and respect the teachers. These multiple goals, whether created by the social contexts or by individuals themselves, may influence their academic accomplishments (Wentzel, 2000).

'Achievement goals' represent the third level of goals and are assumed to function between the very specific task goals and the more global content goals

(Pintrich, 2000). While target goals are very specific preset levels of performance, and content goals may be applicable to many facets of life, achievement goals specifically deal with the reasons or purposes for engaging in an achievement task. This level of goals represents a more integrated and systematic approach to the study of human motivation because it encompasses not just the reasons for engaging in an achievement task but also includes the standards or criteria for judging successful performance. The emphasis is on how the intentions, the goals, and the purpose in performing a task affect the nature of that performance. It is this integrated and organised pattern of beliefs about purposes, competence, success, ability, effort and standards that gives the achievement goals construct the theoretical utility and power in understanding achievement motivation. This is the approach adopted by the present thesis.

### **2.3 Achievement Goal Theory**

Within the achievement goals theory research, different labels or forms of achievement goals have been identified by different researchers such as Ames (1984, 1992a, 1992b), Dweck (1986; Dweck & Leggett, 1988; Elliott & Dweck, 1988), Maehr (Maehr & Braskamp, 1986; Maehr & Nicholls, 1980), and Nicholls (1984, 1989, 1992). There are similarities and differences in their conceptual approaches to the study of achievement motivation.

In each of these theories, a common assumption is that the goal of action is the demonstration of competence and therefore the perception of ability becomes a central variable (Duda & Whitehead, 1998). In addition, although different labels have been used in the achievement goal theory research, there is a common agreement that two major achievement goals operate in achievement settings. The first goal perspective focuses on self-referenced mastery or learning how to do the task and is labelled by terms such as “learning,” “mastery,” and “task-involved” goals. The second perspective emphasises normative comparison of ability or performance relative to others and is labelled by terms such as “performance,” “ability,” and “ego-

involved” goals (Pintrich, 2000). Furthermore, variations in these goal perspectives are linked to different cognition, affect and behaviour. Specifically, a more motivationally adaptive pattern is predicted by mastery goals and a less motivationally adaptive pattern is associated with performance goals, depending on various factors (Ames, 1992a; Dweck & Leggett, 1988; Nicholls, 1989).

Although the different goal perspectives share the above similarities, there are some theoretical distinctions, all of which build on the original work of Maehr and Nicholls (1980). It has been suggested that Maehr and Nicholls have created a new understanding of achievement behaviour (Biddle, 1997). Firstly, Maehr and Nicholls argued that success and failure are not concrete standards of attainment or excellence in achievement settings. Instead, success and failure are considered as psychological states depending on the perception of individuals of whether they have reached their goals. In other words, individuals differ in their personal definitions of success and failure. Secondly, they proposed three types of achievement motivation: ability-oriented motivation, task-oriented motivation, and social approval-oriented motivation. Ability-oriented behaviour focuses on maximising the subjective probability of attributing high ability to oneself and minimising the probability of demonstrating incompetence. This has been modified in sport and exercise psychology to refer to ego goal orientation (Duda, 1993). Task-oriented behaviour focuses on engaging in problem solving for its own sake or to gain a better understanding of the task, rather than to demonstrate high ability. This has been referred to as task goal orientation (Duda, 1993). Finally, social approval-oriented behaviour focuses on maximising the probability of demonstrating virtuous intentions or personal commitment in order to gain social approval from others.

Task-oriented and ability-oriented goals are central constructs from the original work of Maehr and Nicholls (1980). These are represented by the work of Nicholls (1984, 1989), as well as Dweck (1986; Dweck & Leggett, 1988) and Ames (1984, 1992a). Each of these theoretical approaches and their differences will be described in the following sections.



### 2.3.1 Nicholls' Achievement Goal Theory

Nicholls (1984, 1989) extended his earlier theory by proposing that two different conceptions of ability in achievement contexts are embedded in the two goal involvement states of task and ego. These, in turn, influence the cognitive and affective responses of individuals in achievement striving. The two conceptions of ability differ according to the degree of differentiation between ability and effort, and are closely related to the development of the concept of ability in young children. Therefore, it is important to address the differentiation process of effort, luck, task difficulty and ability from a developmental perspective.

#### The Differentiation Process of Conceptions of Ability

Nicholls (1989) uses the concepts of effort, luck, task difficulty and ability to show that the development of conceptions of ability involves a process of differentiation according to the cognitive maturity of the child. To examine how different age groups of children perceive skill and luck, Nicholls and Miller (1985) used a visual matching task containing two versions, that is, skill and luck. In the skill version of the task, a standard line drawing was presented on a card with six other cards, only one of which matched identically and the other five differed slightly. The participants' task was to match one of the six cards with the standard card. In the luck version, all the six cards were placed face down so the participants could only guess the matching card. Structured interview was conducted after the participants familiarised themselves with both versions of the task and were showed the mistakes made by others on each task.

The results of the study showed that children up to the age of seven do not distinguish between the concepts of skill and luck and they do not use them to distinguish between the two types of tasks. Although skill tasks are seen as more difficult and as requiring more effort compared to the luck tasks, effort is expected to improve success on the luck tasks. At the age of seven to eleven, effort is still seen to improve performance on both tasks, but it has a stronger influence on skill tasks than on the luck tasks. Therefore, skill and luck are only partially differentiated at this age. Only from about 11 years onwards are the concepts of skill and luck clearly

differentiated. At this stage, children understand that effort can only affect the outcomes on the skill tasks but not of the luck tasks. As a consequence of this differentiation between skill and luck, children are more likely to try harder on skill tasks and are unlikely to waste effort on tasks involving luck.

To find out how children differentiate between task difficulty and ability, Nicholls and Miller (1983) interviewed children to find out when they formulate their normative conceptions of ability, that is, the understanding that tasks are more difficult and require more ability if fewer people can do them. Using a series of jigsaw puzzles with different numbers of pieces, children at the egocentric level (about five years old) did not recognise that the puzzles with the most pieces required the greatest ability. Ability and task difficulty are judged in a self-referenced way at this stage, both based on the child's subjective probabilities of success. "Hard" means "hard for me" and is equivalent to "I'm not smart enough to do it". At the next intermediate level, labelled as objective level, children start to understand that more pieces in the puzzle mean higher level of difficulty and demand greater ability. Task difficulty is distinguished from subjective probability of success. However, the child cannot differentiate whether failure at a task is due to low ability or high difficulty. This is because ability and difficulty are imperfectly differentiated. As the child grows older, ability and difficulty become clearly differentiated. Using the normative reference, tasks at which only a few can succeed are judged as more difficult and require higher ability. At this level, children reduce the tendency for self-referenced judgements to define competence.

To establish how children differentiate between effort and ability, Nicholls and his colleagues (Miller, 1985; Nicholls, 1978; Nicholls & Miller, 1984) used either film, videotape, or a photograph of two primary school children working on a problem-solving task. One child was shown working diligently and the other only working intermittently but both yielded the same scores on the task.

The results of the above mentioned studies indicated that up to the age of seven, effort or outcome is equated with ability. The explanations of outcomes are tautological (self-referenced). High effort means smarter or people who succeed try



harder. Effort and outcomes are not clearly differentiated as cause and effect at this stage. From ages seven to nine, effort and outcomes are viewed as cause and effect. Equal effort leads to equal outcomes. However, when similar outcomes are obtained with different amounts of effort, children either cannot explain why or they interpret that the diligent worker has misapplied effort or that the lazy child must have worked really hard for a while. Effort and ability become partially differentiated at nine or ten years of age. Although children begin to see that less effort leading to similar outcome means more able, they still assert that equal effort would lead to equal outcomes. Finally, at eleven or twelve years of age, ability is clearly differentiated from effort. The element of ability is viewed as the presently developed level of capacity and that more effort does not indicate high ability. Thus, when equal outcomes occur, the one who exerts less effort implies they have higher ability. Similarly, when the effort exertion is equal, the better performer is seen as more able.

In the process of the differentiation of ability, children, as they get older, move from a less differentiated conception to a more differentiated conception of ability. However, the onset of the process of differentiation and the rate of the developmental process may vary among individuals. In addition, although older adolescents as well as adults possess the more differentiated conception of ability, they may employ this conception or the less differentiated one in achievement settings, depending on the goals that they adopt in the settings.

The two conceptions of ability described manifest themselves in the goals individuals pursue when engaging in achievement-related activity. Individuals tend to employ the undifferentiated conception of ability when they are engaged in tasks that are characterised by low social evaluation, low emphasis on competition, and valued learning processes (Nicholls, 1989). When this conception of ability is induced, individuals are in the state of task involvement. On the other hand, the more differentiated conception of ability as capacity is used when the situation is characterised by high evaluation or as a test, events that increase public self-awareness (e.g., presence of others), or interpersonal competition or comparison (Nicholls, 1989). When this state of differentiated conception of ability is activated, individuals are said to be ego-involved.

Nicholls (1989) maintains that the two goal involvement states are related in an orthogonal way and thus individuals can have different combinations of levels. When task involvement prevails, perceived ability is evaluated in a self-referenced manner and the focus is on achieving mastery, effort investment and progress in learning. On the other hand, when ego involvement prevails, individuals conceive of ability as capacity that limits the effect of effort on performance. Success is other-referenced and the focus is on outperforming others or winning with less effort. Depending on the levels of perceived ability, the two goal involvement states predict different behavioural outcomes in achievement domains. These predictions of the two goal involvement states will be discussed in later sections.

### **2.3.2 Dweck's Approach to Achievement Goals**

Dweck and her colleagues (Dweck, 1986; Dweck & Bempechat, 1983; Dweck & Leggett, 1988; Elliott & Dweck, 1988) took a similar perspective to the study of achievement goals as Nicholls (1989). For example, Dweck (1986, 1999; Dweck & Leggett, 1988) also identifies two goals; learning and performance goals, that resemble task and ego involvement. Learning goals operate when individuals seek to increase their competence and/or learning new skills, or understanding new things. In comparison, performance goals are defined in terms of winning positive judgements of one's competence and avoiding negative ones. However, the two goals are viewed as bipolar rather than independent dimensions in Dweck's approach. In addition, the more and less differentiated conceptions of ability do not play any role in the prediction of goals in Dweck's approach. Instead, Dweck proposed that two clusters of beliefs underpin the adoption of achievement goals. These beliefs centre on the way people view the malleability of intelligence. Specifically, those who subscribe to the view that intelligence is fixed and relatively stable hold an "entity" view or theory, whereas those who perceive intelligence as malleable and open to development hold an "incremental" view or theory. The main concerns of the entity theorists are how much intelligence they have compared to others, and how to look 'smart' and not 'dumb' at all costs (Dweck, 1999). To them, looking smart means easy, low effort success and outperforming others. Looking smart has a different meaning to the

incremental theorists. For them, focusing on effort to increase their intelligence, as well as learning and mastery of new challenging tasks, make them feel smart.

To assess implicit theories of intelligence, Dweck and Henderson (1988) developed a three-item questionnaire containing entity theory items (e.g., 'Your intelligence is something about you that you can't change very much'). Responses were made on a 6-point Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree). Participants scoring a mean score of 3 or lower were classified as entity theorist and those scoring 4 or higher were classified as incremental theorists. The internal reliability was found to be high (.94 to .98 for sample sizes ranging from 32 to 184) and the test-retest reliability was .80 over a 2-week interval (reported in Dweck, Chiu, & Hong, 1995). The measure was found to be independent of gender and age and discriminant validity was supported (see Dweck et al., 1995). No incremental items were included in the measure because of the appealing nature of the items. Recently, Levy and Dweck (1997, cited in Hong, Chiu, Dweck, Lin, & Wan, 1999) revised the implicit-theory measure to an 8-item questionnaire with four items measuring entity beliefs and four items measuring incremental beliefs. However, the psychometric properties of the revised measure have not been tested.

Dweck (1999) suggests that an entity theory of intelligence should lead to the adoption of performance goals (ego involvement) because individuals focus on the notion of fixed intelligence. While incremental theory with its idea of malleable intelligence should promote learning goals (task involvement) since individuals strive to increase their intelligence. Bandura and Dweck (1985) and Leggett (1985, see Dweck & Leggett, 1988) measured children's implicit theories of intelligence before asking them to select tasks embodied with performance goals versus learning goals. They found that those holding an entity view were more likely to endorse performance (ego) goals to gain favourable judgements of that entity or prevent negative judgement of it. Conversely, those with incremental beliefs were more likely to endorse learning (task) goals to increase their competence. Despite evidence in support of entity and incremental beliefs, Dweck et al. (1995) state that 'systematic effort is required on the part of behavioural scientists to identify them (beliefs) and to map out their effects' (p. 267). In addition, they note that entity and incremental



beliefs can be domain-specific. Beliefs in the domain of intelligence, for example, may not be related to those concerning moral behaviour or athletic ability.

In Dweck's approach, conceptions of ability are equated to viewing ability as a fixed and inherent aptitude or an acquirable personal quality. On the other hand, Nicholls' approach maintains that conceptions of ability depend on the more or less differentiation of the concepts of luck, task difficulty, and effort from ability. Therefore, Nicholls' approach to conceptions of ability is different from Dweck's approach in that nothing is implied about individuals' perception of the malleability of ability. Nicholls (1990) criticises Dweck's approach as being too simplistic and vague, and cannot be generalised to activities in the performing arts and sport where intelligence plays a less prominent role. In comparison, Nicholls' approach has been criticised for not being applicable to competitive sport. For example, Hardy (1997, 1998) indicate that differentiation of ability should be a bipolar construct or process in that one either has the tendency to differentiate or not. It is not possible for both tendencies to occur within the same individual at the same time. In addition, if differentiation of ability is a developmental process, older children should adopt the more differentiated conception of ability (ego-oriented) due to their level of cognitive maturity. Therefore, Harwood, Hardy and Swain (2000) argue that it is the individuals' personal theory or conception of achievement of what needs to be done to demonstrate competence that determines their achievement goals but not their conception of differentiated or undifferentiated ability. Nevertheless, it is Nicholls' approach that has been adopted more extensively in the physical domain (Duda, 1993; Duda & Whitehead, 1998; Roberts, 1992) with much less attention given to Dweck's entity and incremental beliefs.

Sarrazin and his colleagues (Sarrazin et al., 1996) contend that Nicholls' approach may be useful in understanding short-term or proximal causes of performance, such as the relative contribution of effort and ability, but not the long-term consequences or the antecedents of adopting conceptions of ability. Rather than arguing about the shortcoming of one theory, a better solution is to investigate the links between goal involvement and implicit theories in the physical domain. In fact, there are parallel research themes not necessarily wedded to Dweck's specific



theorising that give support to similar notions. For example, Jourden, Bandura, and Banfield (1991) provided evidence that self-efficacy and perceptual-motor performance are more positively affected by conceptions of ability associated with acquirable skill than when ability is viewed as inherent aptitude.

In the physical activity domain, Sarrazin et al. (1996) examined the relationship between conceptions of sport ability and the adoption of different goals for children aged 11 to 12 years. Using the Sport Incremental Ability Scale (SIAS) which is a reworded version of Dweck and Henderson's (1988) measure of theories of intelligence, they compared the goal choice results with those from Dweck and Leggett (1988). They found some support for the relationships and showed that such notions could be applied to the physical domain. However, the relationships were less obvious than reported in the academic domain by Dweck and Leggett (1988). Sarrazin et al. (1996) pinpointed two weaknesses in the study. The first weakness was the use of dichotomous goals in which children were asked to choose one goal. Sarrazin et al. found that some adolescents endorsed both conceptions to contribute equally to athletic ability. Consequently, the dichotomous format of measuring beliefs was replaced with a five-point agree/disagree scale for each conception of ability. The second weakness was that the conceptions of sport ability may encompass more than that suggested by Dweck and Leggett (1988). As Nicholls (1992) said, "we cannot effectively study children's conceptions of intelligence or sport competence by simply asking ... whether such skills are changeable or not. Intelligence can have many referents ..." (p. 45). Based on such ideas, Sarrazin et al. (1996) proposed a multidimensional view of athletic (sport) ability by referring to 'scientific' and 'lay' conceptions of ability. The former notion stemmed from the motor behaviour literature (Fleishman, 1964; Schmidt, 1982). In Fleishman's (1964) approach, a distinction was made between abilities and skills. Abilities are defined as relatively stable, genetically determined and rather general, and are not easily modified by practice. Schmidt (1982) suggests that "abilities represent the collection of 'equipment' that one has at his or her disposal" (p. 395). As such, ability limits the effect of learning on performance. Skills, on the other hand, are seen as modifiable through practice and learning, and are specific to a task or group of tasks (Sarrazin et al., 1996; Schmidt, 1982). In addition, Sarrazin et al. also proposed that people hold

'lay' beliefs about sport ability, such as those expressed by parents, fans or journalists. An example of one such notion is that of natural giftedness.

On the basis of the aforementioned theorising, Sarrazin et al. (1996) came up with a multidimensional assessment of sport ability beliefs. Their 'Conceptions of the Nature of Athletic Ability Questionnaire' (CNAAQ) contained 21 items assessing the six sub-domains of learning (sport ability is the product of learning), incremental/improvement (sport ability can change), specific (sport ability is specific to certain sports or groups of sports), general (sport ability generalises across many sports), stable (sport ability is stable over time), and gift (sport ability is a gift, i.e., 'God-given'). This questionnaire was administered to over 300 French adolescents. The results showed that beliefs that sport ability is incremental, and is determined by learning are related to choosing a learning (task) goal. Beliefs that sport ability is a gift and is general are related to choosing a performance (ego) goal.

Using structural equation modelling, Biddle and his colleagues (Biddle, Soos, & Chatzisarantis, 1999a; Lintunen, Valkonen, Leskinen, & Biddle, 1999) tested a model predicting intentions to be physically active from perceived competence, achievement goals, and conceptions of sport ability. Perceived competence was assessed using the Sport Competence items from Fox and Corbin's (1989) Physical Self-Perception Profile, achievement goals were assessed with the 13-item Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Whitehead, 1998), and sport ability beliefs were assessed using the CNAAQ. Both studies involved large samples (N = 723 Hungarian youth in Biddle et al., 1999a, and N = 401 Finnish youth in Lintunen et al., 1999) of 12 to 16 years old adolescents. In general, the results of the two studies supported the contention that beliefs that sport ability is general and a gift predict an ego orientation. In addition, beliefs that sport ability is a product of learning or changeable predict a task orientation. However, the path coefficients were generally small.

In the studies reviewed, some of the sub-scales used in the CNAAQ showed unsatisfactory internal consistency (for example,  $\alpha = .40$  for Specific, and  $\alpha = .41$  for Stable, in Biddle et al., 1999a). This points to a need for further psychometric assessment in terms of validity and reliability. In addition, these studies also suggest that there is a conceptual link between conceptions of sport ability and adoption of different goals in the physical activity domain. Nonetheless, the direction of the relationship is still not known. Thus further study is warranted concerning the direction of influence of sport ability beliefs and goal adoption, as well as the relationships between sport ability beliefs and other motivational variables. These issues will be examined in the first four studies of this thesis (see Chapters 3 to 6).

In summary, there are no doubt clear conceptual differences between the approaches advocated by Dweck and Nicholls. Specifically, Dweck assumes that achievement goals are strongly influenced by personal and individual characteristics, such as personal theories of intelligence, while Nicholls maintains that goals are linked to different ways of judging success. The main concern of this thesis is to understand the links between sport ability beliefs and goals, and the motivational consequences of such beliefs and goals operating in achievement contexts. Despite the conceptual differences underpinning the adoption of goals, Dweck and Nicholls arrive at similar predictions about task involvement (learning goals) and ego involvement (performance goals).

### **2.3.3 Task Involvement and Ego Involvement**

Drawing from the literature, task involvement is presumed to elicit adaptive motivational responses, that is, to engage in behaviours conducive for long-term accomplishment and enhanced performance, irrespective of individuals' perceived ability. For example, effort exertion, persistence, improved performance, positive affect, and choosing challenging tasks rather than easy ones (Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1984, 1989; Roberts, 1992).

As task-involved individuals aim at self-improvement or task mastery, they tend to associate high effort to competence development and mistakes are viewed as



part of the learning process. Thus they are more likely to persist on the task even when faced with setbacks. This process is likely to lead to improved performance and positive affective responses. Choosing very easy tasks is unlikely because there is limited opportunity for learning, therefore they are likely to choose moderately difficult and challenging tasks.

In contrast, ego-involved individuals are concerned with gaining positive judgements of their ability and avoiding negative ones. Therefore, for those who doubt their ability, it is predicted that they will exhibit helpless responses such as effort reduction, lack of trying, negative affect, dropping out of the activity, impaired performance and choosing extreme tasks in terms of the perceived challenge. On the other hand, for those with high perceived ability, it is predicted that they will show similar adaptive behavioural patterns to task-involved individuals. They will also choose challenging tasks of normative difficulty where success would reinforce their level of ability.

Research in the academic and physical domains has supported the major theoretical predictions concerning the two goal involvement states, perceived ability and achievement behaviours. Jagacinski and Nicholls (1984) examined the affective responses of undergraduates under four different scenarios under success conditions with a 2 x 2 experimental design. The two factors were type of involvement (task vs. ego involvement) and effort (high vs. low). In the ego-involving conditions, it was found that when success was achieved with less effort than others (given equal performance), pride and sense of accomplishment were maximised and feeling of embarrassment was minimised. When effort was high under ego-involving conditions, the participants reported the lowest feeling of competence, less pride and guilt, and greater embarrassment. On the other hand, for those in the task-involving conditions, feelings of competence and pride were maximised, whereas guilt and embarrassment were minimised. This study shows that in task involvement, high effort maximises positive affect and minimises negative affect. In the ego-involving conditions, effort is viewed as a double-edged sword whereby lack of effort can increase guilt while high effort can lead to lower perceived ability, and this in turn diminishes pride and sense of accomplishment.



Elliot and Dweck (1988) experimentally manipulated goal involvement (task vs. ego) and perceived ability (high vs. low) in the classroom. It was found that in the task-involving condition, children, regardless of their levels of perceived ability, chose more challenging tasks and valued the opportunities for learning. In addition, when faced with setbacks, these children responded in a mastery-oriented pattern by persisting on the task and using more effective problem-solving strategies leading to better performance. In the ego-involving condition, when children believed that they had high ability, they responded to setbacks in a mastery-oriented pattern, similar to the task-involved children. That is, they persisted on the task and did not express negative affect. However, they tended to place less value on the opportunity to increase their skills on tasks that involved public mistakes. In contrast, when placed in the ego-involving condition, children with low perceived ability exhibited helpless responses, such as negative affect, giving up trying, and impaired performance, when faced with failure feedback.

Similarly, Hall (1990) provided support for the predicted relationships between goal involvement and perceived competence on a stabilometer task. He found that participants with low perceived competence in the ego-involving condition performed less well, reported less effort exertion, and lower success expectancy compared to those in the task conditions, irrespective of perceived competence, and high perceived ability participants in the ego-involving condition.

Likewise, Cury, Biddle, Sarrazin and Famose (1997) found consistent findings in a sport task. In this study, a total sample of 152 school-aged children was investigated to test the predictive value of achievement goals on the investment in learning dribbling skills in basketball. Results showed that children high in ego involvement and low in perceived ability had lower success expectations and showed less persistence on the task than those ego-involved with high perceived ability, task-involved with high perceived ability, and task-involved with low perceived ability. In addition, participants from the ego involvement/low perceived ability group also tended to attribute their failure to ability and wanted to drop out of the task.

Finally, Grieve, Whelan, Kottke, and Meyers (1994) manipulated adult's (aged 17 to 37 years) goal involvement in a basketball shooting task and examined the effects of goals and feedback (success versus failure) on cognition, affect and behavioural outcomes. The results showed that male participants who received failure feedback reported more disturbed moods compared to males receiving success feedback or females in both feedback conditions. Task-involved participants reported better mood states and more internal attributions for performance regardless of feedback compared to the ego-involved participants. No main effect for goals and feedback on task persistence was found. Manipulation checks indicated that while the manipulation was successful in the task-involved group, resulting in a high task/low ego group, the manipulation of ego-involvement created a high task/high ego group but not a low task/high ego group. The authors explained that the use of novices in the task might have made mastery goals more salient and ego goals less salient because of the low value of success or failure on the task.

In sum, the research in the academic and sport domains has supported the prediction that task involvement fosters perceptions of ability when contrasted with ego involvement. However, most of these studies did not use manipulation checks to assess the success of the short-term experimental manipulations so it is not known whether the participants were actually task- or ego-involved in the situation. Even with the manipulation checks, the study of Grieve et al. (1994) showed that ego-involved participants could endorse both mastery and outcome goals. Nicholls (1984, 1989) suggests that individuals are assumed to be predisposed to be task or ego oriented due to socialisation or through previous experiences. Nonetheless, individual differences in proneness to task and/or ego involvement may influence the type of involvement adopted in a particular situation. Therefore, research studies should take into account these dispositional goals when investigating achievement behaviour. These dispositions have been named task and ego orientations.

#### **2.3.4 Measurement of Individual Differences in Task and Ego Orientations**

In order to examine individual differences in dispositional goal orientations, individuals should be asked about their personal criteria of success in a given context.

According to Nicholls, task orientation reflects the tendency for learning new skills or enhancing knowledge and maximising effort, while ego orientation defines success by demonstrating superiority and beating others. In line with this suggestion, Duda and Nicholls (1992) have developed the “Task and Ego Orientation in Sport Questionnaire” (TEOSQ) and Roberts, Treasure and Balague (1998) have developed the “Perception of Success Questionnaire” (POSQ) specifically to measure task and ego orientations in sport. The TEOSQ was adapted from the Motivational Orientation Scale, which was designed to measure task and ego orientation in the classroom (Nicholls, 1989; Nicholls, Patashnick, & Nolen, 1985) by changing the words to be sport specific. A short overview of the development of each questionnaire will be presented.

#### Task and Ego Orientation in Sport Questionnaire (TEOSQ)

In recognising that the sport context is potentially different from the classroom, Duda and Nicholls developed a 16-item TEOSQ (Duda & Whitehead, 1998). Some of the items were taken from the Motivational Orientation Scale (Nicholls et al., 1985) and some were developed by the authors. After initial testing through exploratory factor analysis, three items were dropped due to poor factor loadings. The current form of the 13-item TEOSQ has seven items measuring task orientation and six items measuring ego orientation. Participants respond to the stem ‘I feel most successful in sport when ...’ and indicate their agreement with items indicating task orientation (e.g., ‘I learn something that is fun to do’) or ego orientation (e.g., ‘I score the most points’). Responses are made on a 5-point Likert-type scale with 1 indicating strongly disagree and 5 indicating strongly agree.

The TEOSQ has been widely used in the sport and physical domains with participants from various age groups (from 10 years to 80 years of age) of sport and non-sport participants from different countries and cultural background (Duda & Whitehead, 1998). In a review of more than 70 published articles, Duda and Whitehead (1998) reported normative data for dispositional goal orientations across different samples. This is shown in Table 2.1.



**Table 2.1: Norms of Dispositional Goal Orientations From Studies Using the TEOSQ (data from Duda & Whitehead, 1998)**

Sample	Task Orientation	Ego Orientation
Overall (N = 12239)	4.08 ± .57	2.87 ± .81
Male (N = 1331)	4.11 ± .49	3.05 ± .80
Female (N = 1285)	4.18 ± .47	2.82 ± .78
Under 13 Year Old	4.24 ± .58	2.65 ± .86
Over 13 Year Old	4.26 ± .53	2.92 ± .94

In general, the TEOSQ has been found to have strong psychometric properties. Cronbach's alpha coefficients from the studies reviewed by Duda and Whitehead (1998) revealed that the mean values are .79 for task orientation and .81 for ego orientation. These scales are not significantly correlated with social desirability and both have acceptable test-retest reliability following a 3-week period ( $r = .68$  and  $.72$  for task and ego, respectively).

In terms of factorial validity, the two-factor structure of the TEOSQ has been supported through the use of exploratory factor analysis with oblique and orthogonal rotations (Duda et al., 1995; Duda, Fox, Biddle, & Armstrong, 1992) and confirmatory factor analysis (Chi & Duda, 1995; Guivernau & Duda, 1994). Concurrent validity was also supported through the study of Duda and Nicholls (1992). It was found that strong positive correlations exist between sport task and ego orientation and the corresponding classroom goal orientations of 205 high school students ( $r = .67$  and  $.62$  for task and ego orientations, respectively). Other studies using college students (Guivernau, Thome, & Duda, 1994) and elite athletes (Guivernau & Duda, 1997) have also found consistent results. As such, it can be concluded that the TEOSQ is a reliable and valid instrument for measuring dispositional goal orientations in the sport and physical activity domains.



### Perceptions of Success Questionnaire (POSQ)

Essentially, the POSQ, developed by Roberts et al. (1998), is based on the same conceptual framework as the TEOSQ. The initial 26-item POSQ was reduced to a 12-item questionnaire after preliminary psychometric assessment. The POSQ has the same stem as the TEOSQ, that is, 'I feel successful in sport when ...'. Six items assess task orientation (e.g., 'I overcome difficulties') and six items assess ego orientation (e.g., 'I beat other people'). Responses to the POSQ are also indicated on a 5-point Likert-type scale similar to TEOSQ.

The means of the POSQ from 17 studies, most of which comprised school-age children, are 4.27 ( $\pm .59$ ) for task orientation and 3.03 ( $\pm .79$ ) for ego orientation. These descriptive statistics follow the same pattern as those of the respective scales of the TEOSQ. The average alpha for task orientation was .81 and for ego orientation was .82, and the test-retest reliability after one week was .80 for task orientation and .78 for ego orientation (see Duda & Whitehead, 1998).

The two-factor structure of the POSQ was strongly supported through studies conducted with different populations (Roberts & Ommundsen, 1996; Roberts et al., 1998; Treasure & Roberts, 1994b) via exploratory factor analysis. A recent study using confirmatory factor analysis also gained satisfactory fit of the data to the hypothesised measurement model (TLI = .90, RMSR = .07; Roberts et al., 1998). In the same study, concurrent validity was supported in that high correlations between the two similar scales were found when the POSQ and TEOSQ were administered to the same sample (.71 for task orientation and .80 for ego orientation). In addition, construct validity of the POSQ was established through the predictions concerning task and ego orientations (Roberts & Ommundsen, 1996; Roberts et al., 1998; Treasure & Roberts, 1994b). When the participants were task oriented, they generally believed that the purposes of sport were to develop lifetime skills and personal development. They valued effort as a cause of success, and viewed mastery experiences as sources of satisfaction. In contrast, when the participants were ego-oriented, they tended to believe that the purpose of sport was to enhance status. They

viewed success as determined by external factors and ability, and viewed ability as an important source of satisfaction.

The TEOSQ and the POSQ are based on the same conceptual foundation so they should be viewed as alternative measures of dispositional goal orientations and not as competing measures (Treasure & Roberts, 1994b). Since the development of the TEOSQ and POSQ, a considerable amount of work has been conducted to examine the relationships between task and ego orientation and various indices of motivation in the physical domain. A review of the literature in physical activity domain which has investigated the correlates of goal orientations will follow.

### **2.3.5 Task and Ego Orientations**

The body of motivation research that looked into the correlates of goal orientations has been extensive. In order to review the correlates of goal orientations, two steps were taken to limit the search. First, only studies that have used the TEOSQ or POSQ to measure dispositional goal orientations in sport and physical activity domains were included. Other studies that have used goal measures such as the Competitive Orientation Inventory (Vealey, 1986) or Sport Orientation Questionnaire (Gill & Deeter, 1988) were excluded because they do not assess the same theoretical constructs as the TEOSQ and POSQ (see Duda & Whitehead, 1998). Second, only published articles in English language from 1990 to 2000 were included. Unpublished articles, conference papers, dissertations and qualitative studies were excluded from the review. The relevant studies were identified by means of computer searches (BIDS, First Search, Sport Discus, and PsychLit), manual searches as well as searches of personal files. Key words used in the electronic search were: goal orientations, achievement goals, goal perspectives, task and ego goals, goals, motivation, beliefs, anxiety, enjoyment, and intrinsic motivation.

A total of 64 studies (N = 14,696) were reviewed, 74.2% of the studies involved young people aged between 11 to 19 years. These studies can be classified into ten different categories, they are:

- A. Beliefs about the Causes of Success
- B. Beliefs about the Purposes of Sport/PE
- C. Use of Effective Learning and Competitive Strategies
- D. Perceived Competence
- E. Motives for Participation
- F. Enjoyment and Interest
- G. Anxiety and Coping Strategies
- H. Attitudes towards Intentional Aggressive Acts and Rule Violations or Cheating
- I. Perceptions of Significant Others' Goal Orientations
- J. Motivation-Related Behaviours

The results of the review will be presented in the respective categories. In each case, the predictions of goal perspective theory will be stated. Thereafter, the results of the studies will be discussed according to those predictions. In addition, the main findings of each study will be presented in a summary table with the following additional information: country, questionnaire used to measure achievement goals, type of participants, number of participants, age, goal profile analysis (P), and correlation between task and ego orientations ( $r$ ). Finally, the limitations of research employing dispositional measures will be discussed.

#### A) Beliefs about the Causes of Success

Nicholls (1989) suggested that beliefs about the causes of success and goal orientations form a 'personal theory' with regard to how things operate in achievement settings. It is predicted that task orientation, due to its emphasis on effort, is positively associated with the belief that hard work and collaboration with peers lead to success. On the other hand, ego orientation, with its focus on demonstrating superiority, is positively related to the view that success is achieved through having high ability, or through external factors such as cheating or deception.

In general, the findings in the sport and physical domains are consistent with research in the academic domain (e.g., Nicholls, Cheung, Lauer, & Patashnick, 1989; Thorkildsen, 1988) in supporting the predictions of goal perspective theory. Table 2.2



shows 19 studies conducted across six different countries (USA, UK, Canada, Holland, Spain, and Zimbabwe) using a wide variety of participants, including school children (e.g., Duda et al., 1992), high school students (e.g., Spray, Biddle, & Fox, 1999), disabled athletes (e.g., S. A. White & Duda, 1993), elite athletes (e.g., Guivernau & Duda, 1998), summer camp participants (e.g., Hom, Duda, & Miller, 1993), and adults (e.g., King & Williams, 1997). The majority of these studies have employed the TEOSQ as the measure of achievement goals.

Most of these studies have looked at the independent effects of goal orientations and beliefs. They have shown that beliefs that effort and cooperation lead to success adopted by the task oriented individuals have the potential for long-term adaptive motivational pattern compared to the ego-oriented individuals who believe that superior ability is the key to success.

#### B) Beliefs about the Purposes of Sport/PE

Studies conducted in the academic domain have established that individuals' propensity towards task or ego orientations is related to the belief one holds concerning the wider purposes of the achievement activity (Nicholls, 1989). For example, task orientation has been found to link with the beliefs that the purpose of education is to gain knowledge and becoming useful citizens in the society. Ego orientation has been found to relate to the beliefs that the purpose of schooling is to enhance one's social status and gain wealth (Nicholls et al., 1985; Thorkildsen, 1988). In line with the classroom-based research, research in the sport setting has consistently demonstrated that a task orientation is associated with the belief that the purpose of sport is to promote mastery and the values of effort exertion, enhance social responsibility, as well as encourage lifetime participation (e.g., S. A. White, Duda, & Keller, 1998). Ego orientation has been linked to the belief that sport is a means of enhancing one's status and recognition (e.g., Treasure & Roberts, 1994a). In terms of the purposes of school PE, the findings of Papaioannou and McDonald (1993) and Walling and Duda (1995) have also been consistent with those from the competitive sport domain. Specifically, it has been found that high task-oriented students tend to believe that improvement, hard work and cooperation are important

**Table 2.2: Beliefs about the Causes of Success**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Biddle, Akande, Vlachopoulos, & Fox 1996	Zimbabwe	TEOSQ	School Children	159	12-14	Task orientation associated with belief that effort is important for success Ego orientation associated with belief that success in sport is due to high ability	Y	.03
Duda & Nicholls 1992	USA	TEOSQ	High School Students	207	M=15.1	Task orientation linked to belief in motivation/effort Ego orientation linked to belief in ability	N	-.09
Duda & White 1992	USA	TEOSQ	Elite Intercollegiate Skiers	143	M=21.4	Task orientation related to both effort and ability Ego orientation related to ability, external factors and taking illegal advantage	N	.05
Duda et al., 1992	UK	TEOSQ	School Children	142	M=10.5	Task orientation related to belief that success is due to effort and cooperation Ego orientation related to belief that high ability is important for sport success	N	.11
Guivernau & Duda 1998	Spain	TEOSQ	Elite Student Athletes	155	18-25	Task orientation related to belief in effort Ego orientation related to belief in ability	N	N

Table 2.2: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Hom et al. 1993	USA	TEOSQ	Summer Basketball Camp Participants	55	M=11.3	Task orientation related to belief that motivation/effort result in achievement and de- emphasis on deception for success Ego orientation related to belief that ability and deceptive factors cause success	N	.15
King & William 1997	USA	TEOSQ	Community College Martial Arts Classes	68	M=22.9	Ego orientation linked to belief that external factors and superior ability lead to success Task orientation linked to belief that effort and enjoyment lead to success	N	N
Lochbaum & Roberts 1993	USA	TEOSQ	High School Interscholastic Athletes	296	13-18	Task orientation linked to belief in effort and persistence as causes for success Ego orientation endorsed normative criteria of defining success and achievement	N	N
Newton & Duda 1999	USA	TEOSQ	National Junior Volleyball Players	385	M=15.2	High task-oriented players endorsed belief that effort is a cause for success High ego-oriented players endorsed belief that ability is a cause for success	N	N



Table 2.2: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Newton & Duda 1993a	USA	TEOSQ	Summer Camp Elite Tennis Players	121	M=12.7	Elite athletes tended to be primarily task oriented in sport and held a belief that effort causes success Female higher in task orientation than males Females: Task orientation related to effort, ego orientation related to ability and positive impression Males: Ego orientation related to ability and positive impression	N	N
Roberts & Ommundsen 1996	Norway	POSQ	Elite Athletes	148	M=21.2	Task orientation related to belief that hard work and cooperation lead to success Ego orientation to view that success is achieved through having high ability	N	N
Roberts, Treasure & Kavussanu 1996	USA	POSQ	Undergraduates Athletes	333	M=21.0	High task-oriented athletes believed that effort is the key to succeed than low task oriented athletes High ego-oriented athletes related to belief that external factors, such as impressing the coach lead to success	Y	.08
Solmon & Boone 1993	USA	TEOSQ	College Tennis Classes	90	--	High task orientation associated with belief that success is dependent on effort	N	-.03

Table 2.2: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Spray et al., 1999	UK	TEOSQ	College PE	171	16-19	Ego orientation linked to belief that ability and deceptive tactics lead to success Task orientation linked to belief that success is the result of hard work and effort	N	-.05 .18
Treasure & Roberts 1994a	UK	POSQ	School Children	330	11-16	Task orientation negatively related to belief that success in sport is caused by external factors Ego orientation is linked to belief that external factors cause success	N	.14
VanYperen & Duda 1999	Holland	TEOSQ	Young Elite Soccer Player	75	M=16.4	Ego orientation linked to belief in ability Task orientation related to belief in effort	N	.25 .31
Walling & Duda 1995	USA	TEOSQ (16-item)	High School PE	144	M=15.2	High task orientation was linked to beliefs that success is achieved through intrinsic interest/effort/cooperation High ego orientation linked to belief that success is achieved when students possess high ability High task/Low ego group rejects use of deceptions and less likely to perceive PE should be easy	Y	.31

Table 2.2: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
S. A. White & Duda 1993	Canada	TEOSQ	Wheelchair Basketball players	59	M=15.7	Task orientation related to effort and external factors Ego orientation associated with ability, chance, and taking illegal advantage	N	.57
S. A. White & Zellner 1996	USA	TEOSQ	High School	65	M=15.9	Ego orientation linked to belief in taking illegal advantage for success	N	N

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.



functions of PE, whereas high ego-oriented students are more likely to believe that PE should enhance one's social status, provide them with an easy class and teach them to be more competitive. Table 2.3 summarises the main findings of studies which have sought to examine the relationships between achievement goals and beliefs about the purposes of sport/PE.

### C) Use of Effective Learning and Competitive Strategies

According to achievement goal theory, individuals' beliefs about the causes of success are reflected in their use of learning and competitive strategies in relation to their goals (Ames, 1992b; Dweck, 1986; Nicholls, 1989). Individuals who believe that effort leads to success value practice and competition as means to gain improvement. Conversely, individuals who view high ability as a cause of success in sport are more likely to devalue the role of practice and focus on competition as a means to demonstrate their ability. Therefore, it is predicted that task orientation is related to the use of more effective learning and competitive strategies, such as mastery and problem-solving. In contrast, ego orientation is predicted to be associated with maladaptive learning and performance strategies, such as focusing on outcome and the use of ineffective strategies.

Research conducted in sport and physical activity settings has generally showed a consistent relationship between goal orientations and achievement strategies (see Table 2.4). For example, Lochbaum and Roberts (1993) found that task-oriented athletes view practice as important for skill development, and endorse mastery and persistence as their preferred competitive strategies. Ego-oriented athletes, on the other hand, tend to avoid effort exertion and persistence during practice, and prefer to use normative criteria in practice. In competition, they are more likely to focus on winning as this allows them to demonstrate competence over others.

**Table 2.3: Beliefs about the Purposes of Sport/PE**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Carpenter & Yates 1997	UK	TEOSQ	Male Soccer Players	132	15-35	Ego orientation linked to belief that sport is to gain financial reward and fitness Task orientation negatively related to beliefs that sport should focus on financial gain but positively related to beliefs that purpose of sport should focus on pro-social behaviour	N N
Papaioannou & McDonald 1993	Greece	TEOSQ	School Children PE	211	M=15.8	Task orientation positively correlated with mastery and cooperation as purposes of PE Ego orientation related to view that PE should enhance social status	N N
Roberts & Ommundsen 1996	Norway	POSQ	Elite Athletes	148	M=21.2	Task orientation related to belief that sport fosters pro-social values such as social responsibility, cooperation, respect the rules and lifetime skills Ego orientation related to belief that sport should enhance one's social status	N N
Roberts, Hall, Jackson, Kimiecik, & Tonymon 1995	USA	POSQ	Undergraduates Physical Activity Classes	338	M=20.6	Task oriented individuals endorsed the belief that sport should enhance social responsibility and stimulate lifetime participation High task/High ego and ego oriented individual groups endorsed that belief that sport was a means of enhancing one's status and increase recognition	Y N

Table 2.3: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Treasure & Roberts 1994a	UK	POSQ	School Children	330	11-16	Ego orientation linked to belief that the purpose of sport is to enhance social status	N	.14
Walling & Duda 1995	USA	TEOSQ	High School PE	144	M=15.2	Task orientation linked to belief that PE should provide enjoyable experience and promote healthy lifestyles, cooperation and learning	Y	.31
S. A. White et al., 1998	USA	TEOSQ	Youth Athletes	192	10-13	Task orientation linked to beliefs that sport should enhance self-esteem and sport ethos, promote mastery and effort exertion and encourage an active lifestyle and being good citizens Ego orientation linked to beliefs that sport should promote deceptive behaviour and promote elitism	N	N

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.



**Table 2.4: Use of Effective Learning & Competitive Strategies**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Lochbaum & Roberts 1993	USA	TEOSQ	High School Interscholastic Athletes	296	13-18	Task oriented view practice as a means to foster team cohesion and skill development and strategies used in competition as reasons leading to success Ego oriented preferred to use normative criteria in practice as a means to demonstrate competence relative to others	N	N
Roberts & Ommundsen 1996	Norway	POSQ	Elite Athletes	148	M=21.2	Task orientation endorse practice as a means to enhance improvement and learning and to obtain coach approval Ego orientation linked to preference to compete and avoid practice	N	N
Roberts et al. 1995	USA	POSQ	Undergraduates Physical Activity Classes	338	M=20.6	High task/High Ego individuals value practice and endorsed improvement through practice (mastery-enhancement strategies) In competition, task oriented individuals sought their coaches' approval and eschew winning Ego oriented individuals focus on winning and performance	Y	N
Solmon & Boone 1993	USA	TEOSQ	College Tennis Classes	90	--	High task orientation is related to effective use of learning strategies	N	-.03

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.

#### D) Perceived Competence

In achievement goal theory, Nicholls (1984, 1989) posits that individuals' perceptions of ability are closely related to their achievement patterns. Task-oriented people, employing a less differentiated conception of ability, should focus on self-referenced criteria such as task mastery and self-improvement. Therefore, task orientation should enhance the development of perceived competence. Ego-oriented people are more concerned with the adequacy of their ability in comparison with others, thus it should increase the likelihood of feeling incompetent, especially for those who doubt their ability (see Dweck, 1986, 1999).

Studies which have examined the correlates between goal orientations and perceived competence are summarised in Table 2.5. In general, most studies supported the positive relationship between task orientation and perceived competence. However, ego orientation has also been found to be positively associated to perceived competence (e.g., Duda & Nicholls, 1992; Ebbeck & Becker, 1994). For example, in studies that examined the goal profiles of participants, it was found that children high in both orientations had high perceived competence in basketball (Hom et al., 1993), whereas those low in both orientations had lower perceived competence (Fox, Goudas, Biddle, Duda, & Armstrong, 1994).

Nicholls (1989) has hypothesised that task oriented individuals have adaptive motivational patterns regardless of their level of perceived competence. Ego-oriented people with high perceived competence also tend to show adaptive motivational patterns. However, if perceived competence is low, maladaptive motivational behaviour is predicted to result for those who are ego-oriented. This has been supported in the sport and exercise literature, as well as classroom research (Dweck & Leggett, 1988; Nicholls & Miller, 1984; Seifriz, Duda, & Chi, 1992). In a more recent study, Newton and Duda (1999) found that perceived competence was the most significant predictor of intrinsic motivation, thus supporting the basic premise of competence-based motivational theories (Biddle, 1997). This highlights that when examining the relationship between ego orientation and behavioural correlates, the role of perceived competence must be considered (L. Williams & Gill, 1995).

**Table 2.5: Perceived Competence**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Duda & Nicholls 1992	USA	TEOSQ	High School Children	207	M=15.1	Task and ego orientation positively correlated with perceived competence	N	-.09
Duda et al. 1995	USA	TEOSQ	Undergraduates Volleyball and Basketball	121	M=21.1	Perceived competence correlated with task orientation	N	N
Ebbeck & Becker 1994	USA	TEOSQ	Youth Soccer players	166	M=12	Higher scores on perceived competence predicted both ego and task orientation	N	N
Fox et al. 1994	UK	TEOSQ	School children	231	M=11.1	Children low in both orientations had lower perceived competence	Y	.16
Hom et al. 1993	USA	TEOSQ	Summer Basketball Camp	55	M=11.3	Children high in both orientation had high perceived competence in basketball	N	.15
Seifriz et al. 1992	USA	TEOSQ	High School Male Basketball	105	14-19	Perceived competence predicted by task orientation	N	N



Table 2.5: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
L. Williams 1994	USA	TEOSQ	High School Athletes	152	M=15.9	High task orientation positively associated with self-referenced criteria of competence Ego orientation linked to social comparison information as source of competence information	N	-.10
L. Williams & Gill 1995	USA	TEOSQ	School children PE	174	M=12.7	Perceived competence correlated with task orientation Higher task orientation scores predicted higher perceived competence Ego orientation did not have any significant debilitating effects on perceived competence	N	-.11

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.

### E) Motives for Participation

Few studies have looked into the predictions of achievement goals on motives for participation in sport and physical activity. According to the theory, task orientation should be related to more intrinsic motives for involvement, such as developing skills and being part of the team. In contrast, ego orientation is likely to be coupled with more extrinsic motives for participation, such as social recognition or to gain status. Evidence supporting this hypothesis is summarised in Table 2.6. This line of research suggests that goal orientations can help to explain why people become involve in achievement activity.

### F) Enjoyment and Interest

One of the widely studied correlates of goal orientations is enjoyment or intrinsic interest. Theoretically, task orientation should be positively related to enjoyment, intrinsic interest and satisfaction because the achievement activity is experienced as an end in itself. Ego orientation should be either unrelated or negatively related to such positive affect (Nicholls, 1989). This is because involvement in the activity is experienced as a means to an end, in this case, to demonstrate superior ability over others. Studies conducted in different countries, with different age groups, and participants from various sports and PE have supported these predictions. The summary of these studies is outlined in Table 2.7. In general, task orientation is found to be positively related to enjoyment and intrinsic motivation scores, commonly measured by the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989; McAuley, Wraith, & Duncan, 1991). For example, Fox et al. (1994) established that children with high task orientation, whether alone or in combination with high ego orientation, had a high level of enjoyment compared to children with high ego/low task or low in both goal orientations.

Ntoumanis and Biddle (1999a) conducted a meta-analysis on the effects of achievement goals on positive and negative affect. A total of 37 published articles and conference papers including 41 independent samples (N = 7950) were examined. The results showed that the effect of task orientation on positive affect was moderate-to-

**Table 2.6: Motives for Participation**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
S. A. White & Duda 1994	USA	TEOSQ	Sport Participants	235	M=10.8 to 26.0	Athletes high in task orientation perceived learning opportunities, practice and regular physical exercise as important for sport participation. Task orientation also linked to team membership and affiliation for sport participation Athletes high in ego orientation engaged in sport for competition and gain reward for accomplishment	N	.18
Zaharriadis & Biddle 2000	UK	TEOSQ	Secondary School PE	412	11-16	Students high in task orientation are related to skill development/competition and team atmosphere and negatively associated with the motive of status/recognition Motive for participation for those high in ego orientation was associated with status/recognition incentives	N	.18

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.



**Table 2.7: Enjoyment and Interest**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Biddle et al. 1996	Zimbabwe	TEOSQ	School Children	159	12-14	Task orientation related to feeling of enjoyment and lack of sport boredom	Y	.03
Boyd & Yin 1996	USA	TEOSQ	Athletes	231	M=15	Task-oriented athletes reported higher sport enjoyment Ego orientation unrelated to enjoyment	N	N
Cury et al. 1996	France	POSQ	School Girls	700	M=14.5	Task orientation enhances interest whereas ego orientation unrelated to interest	N	.06
Dorobantu & Biddle 1997	Romania	TEOSQ	School children PE	145	15-16	Task orientation related to intrinsic motivation Ego orientation unrelated to intrinsic motivation	Y	.15
Duda & Nicholls 1992	USA	TEOSQ	High School	207	M=15.1	Satisfaction/enjoyment moderately associated with task orientation whereas boredom negatively related to task orientation	N	-.09
Duda et al. 1995	USA	TEOSQ	Undergraduates Volleyball and Basketball players	107 121	M=20 M=21.1	High task orientation corresponded with high enjoyment and found sport more interesting Intrinsic motivation lower for individuals with high Ego orientation with low perceived competence	N	N

Table 2.7: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Duda et al. 1992	UK	TEOSQ	School children PE	142	M=11	Task orientation related to enjoyment, perceived and less boredom Ego orientation was linked to boredom	N .11
Fox et al. 1994	UK	TEOSQ	School Children	231	M=11.1	A high task orientation, either alone or in combination with high ego orientation was linked to high level of enjoyment compared to children with ego or low in both low orientations	Y .16
Goudas, Biddle & Fox 1994a	UK	TEOSQ	School Children Fitness Test	255	12-15	In the lower performance group, high task/low ego group reported highest enjoyment and effort compared to low task/high ego group	Y N
Goudas, Biddle & Fox 1994b	UK	TEOSQ	School Children PE	85	12-14	Task orientation had direct effect on intrinsic motivation Ego orientation was not associated with intrinsic motivation or associated indirectly through perceived competence	N .24
Goudas, Biddle, Fox & Underwood 1995	UK	TEOSQ	School Children PE	24	M=13	Task-oriented children reported higher intrinsic motivation	N N

Table 2.7: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Hom et al. 1993	USA	TEOSQ	Summer Basketball Camp	55	M=11.3	Enjoyment and satisfaction in basketball are associated with goal orientation	N .15
Kavussanu & Roberts 1996	USA	TEOSQ	University Tennis Classes	285	--	Task orientation was a significant predictor of intrinsic motivation in males Dispositional goal orientations were not significant predictors of intrinsic motivation in females	N .20
Kim & Gill 1997	Korea	TEOSQ	Youth Sport Participants	344	M=13.9	Task orientation positively related to intrinsic motivation No inverse relationship between ego orientation and indices of intrinsic motivation	N .28
Liukkonen, Telama, & Biddle 1999	Finland	POSQ	Soccer Players	557	M=14	Task orientation positively correlated with enjoyment Ego orientation unrelated to enjoyment High task, either alone or with high ego groups reported higher enjoyment whereas ego orientation was negatively related to enjoyment only when combined with low task	Y .02
Newton & Duda 1999	USA	TEOSQ	National Junior Volleyball Players	385	M=15.2	Ego orientation negatively predicted enjoyment/interest	N N



Table 2.7: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Vlachopoulos, Biddle, & Fox 1996	UK	TEOSQ	School Children	304	M=13.2	High task orientation corresponded with higher enjoyment/interest than those with high ego orientation	Y	.07
Vlachopoulos & Biddle 1997	UK	TEOSQ	School Children	1070	11-16	Task orientation had direct effect on positive emotion regardless of level of perceived competence Ego orientation with low perceived competence slightly augmented negative affect and minimised positive affect	N	.06
L. William & Gill 1995	USA	TEOSQ	School Children PE	174	M=13	Task orientation directly predicted intrinsic interest and indirectly through perceived competence Ego orientation did not have any significant debilitating effect on intrinsic interest	N	-.11

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.

high ( $r = .36$ ). In contrast, the effect of ego orientation on positive affect was very small ( $r = .07$ ) but not negative. The authors claimed that all the studies to date were correlational and thus causal relationship cannot be inferred. This indicates that there is a need for experimental studies to examine the effects of goals on affective outcomes.

Enjoyment and intrinsic motivation may be important mediators of the effects of goals on performance. Therefore, it is important to have a clear understanding of the conceptual link between goals and intrinsic motivation. According to Self-Determination Theory (SDT), task orientation enhances intrinsic motivation because the focus is on task mastery, promoting challenges and supporting autonomy (Deci & Ryan, 1985; Dweck & Leggett, 1988). In contrast, ego orientation produces external pressures to perform well leading to an increase in anxiety, which should diminish intrinsic motivation (Dweck, 1986; Nicholls, 1989). The links between goals and intrinsic motivation will be examined in a later section.

### G) Anxiety and Coping Strategies

Recent studies have examined the relationships between goal orientations, anxiety and coping strategies. According to theoretical predictions, task orientation corresponds with lower level of anxiety and more adaptive coping strategies (e.g., problem-focused coping) whereas ego orientation tends to increase anxiety and be associated with less effective coping strategies (e.g., emotion-focused coping strategies or task avoidance). The summary of these studies is shown in Table 2.8. The studies reviewed are generally consistent with the theory. For example, one of the most recent studies by Hatzigeogiadis and Biddle (2000) showed that task orientation is related negatively to thoughts of escape during competition, regardless of levels of perceived competence. On the contrary, ego orientation coupled with low perceived competence is positively related to thoughts of escape during competition. Ommundsen and Pedersen (1999) examined 250 Norwegian young athletes and found that high task orientation corresponded with low level of cognitive anxiety and was unrelated to somatic anxiety, regardless of levels of perceived competence. However, ego orientation was unrelated to both somatic and cognitive anxiety.

**Table 2.8: Anxiety and Coping Strategies**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Hall & Kerr 1997	UK	TEOSQ	Junior Fencers	111	M=12.8	Ego orientation was positively related to cognitive anxiety prior to performance Task orientation was not a significant predictor of cognitive anxiety prior to performance but negatively related to somatic anxiety and positively related to confidence immediately prior to the event	N	.10
Hatzigeorgiadis & Biddle 2000	UK	TEOSQ	Tennis & Snooker Club Participants	182	M=30.4	Task orientation negatively related to thought of escape regardless of level of perceived competence Ego orientation with low perceived competence positively related to thought of escape while those with high perceived competence not significant	N	.10
Newton & Duda 1993b	USA	TEOSQ	Undergraduates Bowling classes	47	M=20.9	Task orientation related to greater enjoyment and less performance worry	N	
Ntoumanis & Biddle 1998	UK	TEOSQ	Undergraduates Athletes	146	M=21	Ego orientation with high perceived competence was associated with low level of anxiety No significant link between task orientation and anxiety scores	N	-.03



Table 2.8: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Ntoumanis, Biddle & Haddock 1999	UK	TEOSQ	University Athletes	356	M=20.8	Task orientation related to problem-focused coping strategies Ego orientation linked to avoidance and emotion-focused coping strategies	N .04
Ommundsen & Pedersen 1999	Norway	POSQ	Young Athletes	250	M=13.8	High task orientation corresponded with low levels of cognitive anxiety regardless of levels of perceived competence, and unrelated to somatic anxiety Somatic anxiety and cognitive anxiety were unrelated to ego orientation	N -.24
Papaioannou & Kouli 1999	Greece	TEOSQ	High School Children	239	M=13	Task orientation was a positive predictor of concentration and autolelic experience Goal orientation did not predict cognitive anxiety	N N
Pensgaard & Roberts 2000	Norway	POSQ	Winter Olympic Elite Athletes	69	M=25.2	Dispositional goal orientations were not significant predictor in total distress	N N
Solmon & Boone 1993	USA	TEOSQ	College Tennis Classes	90	--	Task orientation associated with lower level of anxiety	N -.03

Table 2.8: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	Y	.11
S. A. White 1998	USA	TEOSQ	Athletes	279	M=14.4	High ego/low task athletes reported higher competitive trait anxiety whereas high task/low ego group reported lowest trait anxiety	Y	.11
S. A. White & Zellner 1996	USA	TEOSQ	High School & Intercollegiate Athletes	251	14-22	Ego orientation linked to high level of cognitive anxiety (worry)	N	N

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.

In the meta-analysis conducted by Ntoumanis and Biddle (1999a), it was found that the effect of task orientation on negative affect was negative and small ( $r = -.11$ ), while the effect of ego orientation on negative affect was very small ( $r = .02$ ).

#### H) Attitudes towards Intentional Aggressive Acts and Rule Violations or Cheating

Due to ego-oriented individuals' emphasis on demonstrating high ability or winning, it is logical to predict that they will be less concerned with rules and fairness, as well as the safety of their opponents. On the other hand, task-oriented individuals will be less likely to endorse aggressive behaviours and therefore have higher levels of sportspersonship. Very few studies have examined these propositions. Only three published studies were located (see Table 2.9). The findings of two of the studies are in accordance with the theoretical predictions. That is, ego orientation is positively related to greater approval of aggressive acts, and task orientation corresponds with more sportspersonship behaviours. Interestingly, Stephens and Bredemeier (1996) found that goal orientations were not related to injurious behaviours, but the players' perception of their coaches' ego orientation instead predicted intentional aggressive acts. It should be noted that only a female sample was used in this study. It was argued that girls at this young age could have been easily affected by the perceptions of others.

#### I) Perceptions of Significant Other's Goal Orientations

Nicholls (1989) posits that the tendency of a person to be ego- and/or task-involved is assumed to be the result of childhood socialisation experiences. Therefore, individuals' goal orientations are expected to be related to the perceived goal orientations of significant others, such as parents or coaches. The results of the reviewed studies supported this assumption (see Table 2.10). For example, Duda and Hom (1993) showed that children high in a particular goal orientation perceived their significant parents to be also high in that goal orientation.



**Table 2.9: Attitudes toward Intentional Aggressive Acts and Rule Violations or Cheating**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Duda, Olson, & Templin 1991	USA	TEOSQ	High School Interscholastic Basketball players	123	M=16.6	Low task/High ego students were more likely to endorse unsportsmanlike play/cheating High ego orientation positively related to intentional aggressive acts	N	.02
Dunn & Dunn 1999	Canada	TEOSQ	Youth Ice Hockey Players	173	M=13.1	Ego orientation positively related to greater approval ratings of the use of aggressive behaviour Task orientation linked to more sportsmanlike behaviour, such as respect the rules, officials, and social conventions	Y	.22
Stephens & Bredemeier 1996	USA	TEOSQ	Young Female Soccer Players	212	M=11.5	Goal orientations unrelated to injurious behaviours Player's perception of their coaches' ego orientations predicted the likelihood to be aggressive	N	.00

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.

**Table 2.10: Perceptions of Significant Others' Goal orientations**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Duda & Hom 1993	USA	TEOSQ	Summer Basketball Camp	76	--	Children high in a particular goal orientation perceived their significant parents to be also high in that goal orientation	N N
Ebbeck & Becker 1994	USA	TEOSQ	Youth Soccer Participants	166	M=12.0	Players' task and ego orientation were predicted by players' perception of their parents' definition of success in self-referent or norm-referent terms respectively	N N
Escarti, Roberts, Cervelló, & Guzmán 1999	Spain	POSQ	Athletes	134	M=15.2	Athletes high in both goal orientations perceived their peers, parents and coaches had criteria of success that were high in both task and ego involving criteria Task-oriented athletes did not perceive their parents and coach used task involving criteria	N .18
Kimiecik, Horn & Shurin 1996	USA	TEOSQ	High School Children	81	11-15	Children's task orientation was significantly related to perception of their parent held task orientation for their success High scores on perceived parents' task orientation were associated with a high players' task orientation	N N

**Table 2.10: Cont.**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
S. A. White 1998	USA	TEOSQ	Athletes	279	M=14.4	Athletes high in ego orientation were more likely to perceive their parents endorsed a performance climate High task/low ego group perceived their parents emphasized on mastery climate	Y	.11

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.



## J) Motivation-Related Behaviours

Adaptive motivated behaviours are reflected in terms of task choice, exerted effort, persistence and performance. Task-oriented people and ego-oriented people with high perceived ability should, theoretically, be linked to more motivationally adaptive patterns such as choosing moderately challenging tasks, exerting maximal effort, showing persistence and improved performance. On the other hand, ego-oriented individuals with low perceived competence are hypothesised to exhibit less adaptive motivational behaviours.

There are surprisingly few studies in the literature examining the behavioural correlates of goals (Biddle, 1999; Duda & Whitehead, 1998). Research to date shows that task orientation is positively related to self-reported moderate-to-vigorous physical activity levels (Dempsey, Kimiecik, and Horn, 1993; Kimiecik, Horn & Shurin, 1996), selecting more challenging tasks (Solmon & Boone, 1993), and perceived self-disciplined in PE classes (Papaioannou, 1998). Goal profiles analysis shows that those high in task orientation are more likely to be involved in sport (Fox et al., 1994) and to participate in voluntary PE classes (Spray & Biddle, 1997). Those low in both orientations may be more vulnerable to non-participation (Fox et al., 1994).

The next variable closest to behavioural measures is intention. The relationship between intentions to be physically active and goals shows that task orientation predicts intentions to be physically active directly and indirectly through perceived competence. Ego orientation is found to be mediated by perceived competence in predicting intentions (Biddle et al., 1999a; Lintunen et al., 1999). Papaioannou and Theodorakis (1996) also showed that task orientation is related to intentions to participate in PE classes for Greek high school children. The summary of the findings is presented in Table 2.11.

In short, little is known about how goals affect a wide range of behaviours, such as intentions, amotivation, participation levels, persistence and task choice. Most of the studies have employed self-reported behaviour rather than actual behavioural

**Table 2.11: Motivation-related Behaviours**

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P r
Biddle et al. 1999a	Hungary	TEOSQ	School Children PE	723	12-16	Task orientation directly predicted intentions to be physically active and indirectly through perceived competence The relationship between ego orientation and intention was mediated by perceived competence	N .09
Dempsey et al. 1993	USA	TEOSQ	School Children	71	M=10.2	Task orientation positively related to children's moderate-to-vigorous physical activity (MVPA) and accounted for 5% of variance in MVPA Ego orientation unrelated to children's MVPA	Y .16
Fox et al. 1994	UK	TEOSQ	School Children	231	M=11.1	Children low in both orientations were most at risk for non-participation in sport	N N
Kimiecik et al. 1996	USA	TEOSQ	High School Children	81	11-15	Children's (MVPA) was predicted by both goal orientations, that is, those high in both goal orientations tended to report they engaged in MVPA	N N
Lintunen et al. 1999	Finland	TEOSQ	School Children	401	12-16	Task orientation predicted intentions to be physically active directly and indirectly through perceived competence Ego orientation mediated by perceived competence in predicting intentions	N .03

Table 2.11: Cont.

Study	Country	Goals Scale	Participants	N	Age	Summary of Results	P	r
Papaioannou, 1998	Greece	TEOSQ	School Children	674	10-15	High task oriented children perceived themselves as more disciplined than low task-oriented children because they value learning, show concern for others, being responsible and enjoy the learning process	N	N
Papaioannou & Theodorakis, 1996	Greece	TEOSQ	High School Children	394	14-17	Task orientation related to intentions to participate in all PE lessons	N	N
Solmon & Boone, 1993	USA	TEOSQ	College Tennis Classes	90	--	Task-oriented students selected more challenging task Ego orientation was negatively related to selecting challenging tasks	N	-.03
Spray & Biddle, 1997	UK	TEOSQ	College Students	160	16-18	Task orientation positively related to voluntary participation in PE No difference between participants and non-participants in ego orientation scores	Y	-.05

Note: P = Goal Profile analysis; r = Correlation between task and ego orientations; Y = Yes; N = No.



measures. One exception is a recent study by Cury and his colleagues (Cury et al., 1997). They found that ego-oriented individuals with low perceived competence spent significantly less time in practising during a free-choice period compared to those with high perceived competence and high task groups. In the light of the review, more studies should be conducted to examine the direct impact of goals on actual behavioural consequences rather than self-reported measures.

### Summary

Studies reviewed in this section deal with the correlates of dispositional goal orientations. These studies show that the two conceptions of ability are part of different 'world views' or 'approach tendencies' that lead people to think, feel and act differently in similar achievement settings. In general, a high task orientation leads to more adaptive motivational patterns, whereas a high ego orientation leads to maladaptive motivational patterns. Although these studies support the general predictions of achievement goal theory, there are a few drawbacks with this type of research.

Firstly, since task and ego goals are largely orthogonal in nature (Nicholls, 1989), research studies should examine their interactive effects rather than discuss the effects of each goal independently. In fact, 82.8% of the studies reviewed in this section did not examine the goal profiles of participants. By ignoring the independence of task and ego orientations, it is possible that incorrect conclusions may have been made. Nonetheless, all studies support the claim that a high task orientation is always good for motivation.

Secondly, even with studies that have examined goal profiles, researchers usually use mean- or median-splits to create the four goal orientation profiles of high task/high ego, high task/low ego, low task/high ego and low task/low ego groups. Due to the very skewed distribution of the task orientation score, even the low task/low ego group would have relatively high task orientation scores, at least when compared to those of ego orientation. It can be argued that this way of artificially imposing a structure on the observed data may not fit 'reality'. Also, since task and ego

orientations may vary within the same person (Ntoumanis & Biddle, 1999a), it makes sense to examine the intraindividual differences in goal profiles rather than to look at individual differences. This issue will be addressed in Chapter 5 of this thesis.

Thirdly, studies examining correlates of goal orientations have centred on beliefs, affect, and attitudes. Little is known about the behavioural impact of goal orientations, thus there is a need for future research to look at this issue. In particular, there is a need to examine the role of goal orientations in influencing intention or predicting amotivated behaviour. Some evidence suggests that task orientation directly predicts intentions to be physically active whereas ego orientation predicts intention only through perceived competence (Biddle et al., 1999a). This requires further study and will be addressed in Study 1 of this thesis. In addition, the relationship between goal orientations and amotivated behaviour has remained unexplored in the physical domain. The findings of this relationship may shed light on the reasons as to why some people lack persistence and motivation in sport and exercise participation. Study 2 of this thesis examines the links between goals and amotivation, with perceptions of competence as a possible moderator.

Finally, achievement goal theory is built on the motivational states of individuals rather than their predispositions. The theory states that it is the actual goal involvement that will ultimately influence how people think or act in achievement contexts. Focusing on dispositional goal orientations provides little scope for intervention to take place (Lloyd & Fox, 1992; Nicholls, 1989), therefore situation-specific measures should be employed to provide better predictors of cognitive, affective and behavioural responses and for interventions to take place by modifying the environmental cues or structure (Harwood et al., 2000; Harwood & Swain, 1998). The review now turns to research that has examined the situational aspects of achievement goals.

### **2.3.6 Ames' approach to achievement goals**

Ames's work focuses on the situational antecedents of goal involvement and the resulting motivation patterns in the classroom (Ames, 1984, 1992a, 1992b). She

argued that significant others, such as teachers, parents and coaches can create different 'motivational climates' perceived by the students by increasing the saliency of cues, reward systems, and expectations. Two main motivational climates have been identified. They are 'performance' (ego-involving) and 'mastery' (task-involving) motivational climates. In essence, students are more likely to perceive a performance climate when interpersonal competition is emphasised, mistakes are punished, and high normative ability is rewarded. On the other hand, they are more likely to perceive a mastery class climate when the situational cues emphasise learning and improvement, effort is rewarded, mistakes are seen as part of learning, and choice is provided (Ames, 1992a, 1992b).

Ames and Archer (1988) examined the relationship between high school students' perceived motivational climate and motivational processes. It was found that when students perceived their class climate as mastery-oriented, they showed more adaptive motivational patterns, such as the use of effective learning strategies, selection of more challenging tasks and beliefs that effort leads to success. In contrast, students who perceived a performance climate were more likely to make ability attributions for poor performance.

As a consequence of the aforementioned findings, Ames (1992b) has sought to identify classroom structures that can contribute to the adoption of a mastery (task) goal orientation. Based on Epstein's (1989) work, she proposed that six variables could affect the way classroom structure may foster a mastery (task) orientation. They are: Task (design of the task for variety, individual challenge and active involvement), Authority (involvement in decision-making and leadership roles), Recognition (rewards for individual progress and improvement), Grouping (use flexible and heterogeneous grouping), Evaluation (standards of performance according to individual progress and improvement), and Time (provide opportunity and time for improvement). These six variables are identified by the acronym TARGET. In addition, Ames (1992b) has emphasised that it is the subjective meaning of the environment that is critical in predicting the cognitive and affective components of the motivational processes.



Ames' (1992a, 1992b) approach is in line with the theoretical approach of Nicholls (1989) and Dweck (1986; Dweck & Leggett, 1988). According to Dweck and Leggett, "Dispositions are seen as individual difference variables that determine the a priori probability of adopting a particular goal and displaying a particular behavior pattern, and situational factors are seen as potentially altering these probabilities." (p. 269). As a result, research in sport and exercise psychology has begun to examine the role of perceptions of the motivational climate in creating adaptive and maladaptive motivational processes in the physical domain.

### **2.3.7 Perceived Motivational Climates in Sport and Physical Activity Domains**

Ntoumanis and Biddle (1999b) have provided a detailed narrative review of studies from 1984 to 1999 that have examined the effects of motivational climates on motivational outcomes in sport and PE settings. Additionally, they have also calculated the effect sizes of 14 studies (N = 4484) to indicate the strength of the relationships between motivational climate and cognition and affect. After correcting for sampling and measurement errors, the result of the meta-analysis showed that the effect of perceived mastery climate on positive motivational outcomes, which included satisfaction, positive attitudes towards PE lessons, and intrinsic motivation, was .71, indicating a large effect. By contrast, the effect of performance climate on positive outcomes was negative and small-to-moderate (ES = -.30). Negative motivational outcomes were also analysed and these comprised factors such as worry, anxiety, and an emphasis on normative ability. The impact of performance climate on negative outcomes was moderate and positive (ES = .46), and the impact of mastery climate on negative outcomes was small-to-moderate and negative (ES = -.26). In general, these findings indicate that a mastery climate is important in creating more adaptive motivational patterns, while a performance climate is associated with less adaptive psychological outcomes in sport and physical activity.

The research on perceived motivational climates has significantly contributed to the advancement of knowledge concerning situational influences on cognition, affect and behaviours. However, this line of research still suffers from one drawback, that is, it has tended to focus on the independent effects of situational goal structures

and has often ignored the influence of dispositional goal orientations. According to achievement goal theory, dispositional goal orientations and perceptions of motivational climate should interact with each other in creating different motivational patterns. Therefore, it is essential to adopt an interactionist approach that examines the combined effects of both dispositional and situational goal structures to gain a more complete understanding of achievement behaviours. Moreover, the role of perceptions of ability need to be examined alongside the interaction effects (Newton & Duda, 1999).

To test the above hypothesis, Newton and Duda (1999) examined the interaction effects of motivational climate, dispositional goal orientations, and perceived competence in predicting indices of motivation. The study involved 385 female volleyball players from forty-five national junior teams. Using a moderated hierarchical regression method, the results revealed no interaction between the three independent variables. However, interaction between dispositional goal orientations and perceived climate on effort beliefs was found. This suggests that high task-oriented athletes remain high in effort beliefs regardless of perceived climate. In contrast, the low task-oriented athletes in a mastery climate were more likely to endorse the belief that effort leads to success. This shows that strong situational cues can override goal dispositions when dispositional tendencies are not strong.

Although this thesis is not directed toward the study of perceived motivational climates, the research reviewed so far suggests that situational cues, teachers' instructions, feedback, task structure, and perceived choice have an impact on goal adoption and subsequent motivational outcomes of individuals. A key issue is to identify the mechanisms underlying these processes. Thus, there is a need to examine the function that the goal has or the needs it fulfils. For this reason, the next section of the review turns to self-determination theory.

## 2.4 Self-Determination Theory

The study of motivation begins with the ‘why’ question of behaviour (Deci & Ryan, 1985; McClelland, 1985; Weiner, 1992), therefore the reasons for engaging in an activity reflect the person’s motivation. From previous sections, it is clear that students may participate in physical activity or sport for various reasons, such as to have fun, to improve their skills, or to outperform others. These goal states, dispositions, or situational motivational antecedents might be linked to intrinsic and extrinsic motivation, and many researchers have speculated about the nature of such a link (Duda et al., 1995; Nicholls, 1989; Rawsthorne & Elliot, 1999). For example, Nicholls (1989) argues that intrinsic motivation is evident when people do something for its own sake. Task (mastery) goals are therefore predicted to promote intrinsic motivation because involvement in the activities is experienced as an end in itself. With its emphasis on developing competence, these goals are likely to lead to processes such as working hard, challenge seeking, persistence and task involvement (Butler, 1987; Dweck, 1986; Nicholls, 1989) thereby increasing the intrinsic motivation of the task itself. Ego (performance) goals, on the other hand, are predicted to have a negative relationship with intrinsic motivation because the experience of engagement in the tasks is taken as a means to an end. In this case, the focus is to demonstrate competence rather than to enjoy the task as an end in itself (Nicholls, 1989).

From the self-determination theory perspective, these goals are driven by psychological needs (Deci & Ryan, 1985, 1987; Ryan & Deci, 2000a, 2000b). Self-determination theory (SDT) is an organismic theory of motivation that accounts for three psychological needs that are crucial in the energisation of human behaviour, these are: the needs of autonomy, competence and relatedness (social needs) (Deci & Ryan, 1985; Ryan, 1995). The need for autonomy is defined as the need to feel ownership of one’s behaviour (deCharms, 1968). The need for competence refers to the need that individuals want to produce desired outcomes and to experience mastery and effectiveness when dealing with their environment (Harter, 1978; R. W. White, 1959). The need for relatedness is the need to feel that one can relate to others and



with the social world in general (Ryan, 1993). People are motivated to satisfy these needs because they are considered essential for the development of the self in terms of growth, social development and personal well-being (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000a, 2000b).

Vallerand and Losier (1999) suggest that, conceptually, since these needs are essential for personal growth and actualisation, people are intrinsically motivated to be involved in activities that fulfil these needs. In practical terms, it means that researchers can identify the social conditions that are most likely to facilitate these needs. In this respect, SDT is not only concerned with intrinsic motivation towards satisfying these needs for autonomy, competence and relatedness, but also with the social environment or external events that can impact upon the intrinsic motivation of individuals. Cognitive Evaluation Theory (CET) was proposed as a mini-theory within SDT (Deci & Ryan, 1985) to specify the conditions of the social environment of an achievement situation that influence intrinsic motivation. Four formal propositions are proposed in CET.

In the first proposition, CET states that intrinsically motivated activities are autonomous or self-determined. For intrinsic motivation to be enhanced, individuals must be led to perceive that they are the “origins” (internal perceived locus of causality) of their behaviour rather than “pawns” (external perceived locus of causality).

The second proposition further specifies that feelings of competence and optimal challenge enhance intrinsic motivation. Any social-contextual events (e.g., rewards, communication, feedback) that promote one’s feeling of competence will enhance intrinsic motivation for that activity, whereas those events that diminish one’s sense of effectance will undermine intrinsic motivation. Non-challenging activities (tasks that are either too hard or too difficult) fail to increase perceived competence and hence will not enhance intrinsic motivation. In addition, in order for perceived competence to enhance intrinsic motivation, people must experience their behaviour to be self-determined. In other words, feelings of competence will enhance intrinsic motivation only if they exist in the context of autonomy (Ryan & Deci,

2000a, 2000b). In this respect, achievement goal theory has been criticised for being incomplete in explaining the effects of external events on intrinsic motivation because it fails to take into account the mediating effects of perceptions of autonomy and relatedness (Vallerand & Losier, 1999).

In addition, the third proposition of CET describes the importance of the functional significance (i.e., psychological meaning) of the external events perceived by the actors. These events can be perceived as either informational, controlling or amotivating. Informational events are those events that are perceived to convey feedback about the individual's competence and should, when positive, enhance intrinsic motivation. Controlling events are those that are perceived as applying pressure to act or to think in a particular way. Amotivating events are those that do not carry any feedback about competence or autonomy. If the actor perceives external events as controlling or amotivating, his/her intrinsic motivation will be diminished.

The final proposition made by CET focuses on events inside the person. Similar to external events, intrapersonal events can be perceived as informational, controlling or amotivating. Certain thoughts and feelings can also make the actor feel pressured to act in a less self-determined way. Ryan (1982) argues that ego involvement is a good example of controlling events because individual's self-esteem is hinged upon the outcomes of his or her performance. This should lead to a decrease in intrinsic motivation.

A substantial amount of laboratory and field research has provided support for these four propositions of CET (for a review see Deci, Koestner, & Ryan, 1999; Deci & Ryan, 1985, 1991; Frederick & Ryan, 1995; Ryan & Deci, 2000a, 2000b; Ryan, Vallerand, & Deci, 1984; Vallerand & Losier, 1999). For example, Orlick and Mosher (1978) examined the impact of rewards on intrinsic motivation in engaging in a physical task. Children aged 9 to 11 years participated on a stabilometer task either for rewards or for no reward. Four days later, they returned to repeat the activity and it was found that participants in the reward condition showed lower levels of intrinsic motivation, as measured by a free-choice paradigm, whereas participants in the no reward condition showed an increase in intrinsic motivation. This study, along with

other previous studies (Deci, 1971; Halliwell, 1978; Lepper, Greene, & Nisbett, 1973; Thomas & Tennant, 1978) showed that intrinsic motivation for the task is undermined by the use of extrinsic rewards. Deci (1975) theorised that this is because the introduction of rewards shifts the perceived locus of causality from internal to external, confirming the basic premises of CET.

A recent meta-analysis conducted by Deci, Koestner and Ryan (1999) examined the effects of extrinsic rewards on intrinsic motivation. They reviewed 128 experimental studies taken from 94 published articles and 19 doctoral dissertations published between 1971 and 1997. The results of the hierarchical meta-analysis showed that all tangible rewards and all expected rewards undermined free-choice intrinsic motivation ( $d = -.34$  and  $-.36$ , respectively). In the sub-levels of expected rewards, engagement-contingent, completion-contingent, and performance-contingent rewards all had undermining effects on free-choice intrinsic motivation ( $d = -.40$ ,  $-.44$ , and  $-.28$ , respectively). Although verbal rewards had a significant positive effect on free-choice intrinsic motivation ( $d = .33$ ), this effect was found only for college students but not children. In terms of self-reported interest, similar findings were established with smaller effect sizes (tangible rewards,  $d = -.07$ ; expected rewards,  $d = -.07$ ; engagement-contingent,  $d = -.15$ ; completion-contingent,  $d = -.17$ ), with the exception of performance-contingent rewards ( $d = -.01$ ) having no effect on self-reported interest. This comprehensive meta-analysis confirms that all types of tangible rewards made contingent on task performance undermine intrinsic motivation for interesting tasks.

In addition to tangible rewards, a variety of experimental studies using varied tasks and age groups also showed that other factors, such as threat of punishment (Deci & Cascio, 1972), externally set deadlines (Amabile, DeJong, & Lepper, 1976), surveillance (Plant & Ryan, 1985), evaluations (Amabile, 1979; Benware & Deci, 1984), directives (Koestner, Ryan, Bernieri, & Holt, 1984), and competition pressure (Reeve & Deci, 1996) also undermine intrinsic motivation. These studies showed that these factors undermine people's feeling of self-determination, that is they control people's behaviour.



The role of perceived competence in influencing intrinsic motivation has been investigated in the classroom context as well as sport and PE settings (Harter & Connell, 1984; Thill & Mouanda, 1990; Vallerand, 1983; Vallerand & Reid, 1984; Weinberg & Ragan, 1979; Whitehead & Corbin, 1991). In the classroom setting, Harter and Connell (1984) reported that students' perceived competence is positively related to their intrinsic motivation in school. In the sport setting, Thill and Mouanda (1990) found that negative feedback resulted in a decrease in intrinsic motivation in a group of African handball players. Vallerand (1983) reported that young hockey players who received positive feedback reported higher intrinsic motivation than those who received no feedback. Although these studies indicate that positive performance feedback enhances intrinsic motivation whereas negative performance feedback diminishes it, they do not reveal the role of perceived competence in influencing individual's intrinsic motivation.

Vallerand and Reid (1984) proposed that perceived competence acts as a mediator of feedback on intrinsic motivation. They tested this hypothesis with a group of male undergraduates in a PE setting. Participants performed a stabilometer task under either a positive feedback condition, a negative feedback condition, or a no feedback condition. Using path analysis, it was revealed that the effects of verbal feedback on intrinsic motivation were mediated by perceived competence. In fact, perceived competence accounted for more than 40% of the variance in intrinsic motivation, whereas feedback only accounted for 8%. Further studies investigating the mediating role of perceived competence between feedback and intrinsic motivation from laboratory (Vallerand & Reid, 1984), physical activity (Whitehead & Corbin, 1991) and sport settings (Losier & Vallerand, 1994) have provided similar results.

According to CET, significant others' behaviours can also impact upon the intrinsic motivation of individuals (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000a, 2000b; Vallerand & Losier, 1999). In the classroom context, the teacher is probably the most influential person in the environment. The ways teachers interact with students in the classroom can either facilitate or undermine intrinsic motivation of the students. Specifically, the teacher can either communicate with a controlling style,

such as giving directives, exerting pressures, or controlling over the students' behaviour, or interact in an autonomy-supportive way that enhances autonomy and choice of the students. Several studies have shown that autonomy-supportive teachers enhance their students' intrinsic motivation, curiosity and challenge seeking behaviours (e.g., Deci, Nezlek, & Sheinman, 1981a; Flink, Boggiano, & Barrett, 1990; Koenings, Fielder, & deCharms, 1977; Ryan & Gronlick, 1986).

In the classroom domain, Deci et al. (1981a) examined the effects of teachers' orientation towards supporting children's autonomy versus controlling children's behaviour. Thirty-five teachers' orientations were measured at the beginning of the school year. Seven months later, students' perceptions of their class climate, perceived competence and intrinsic motivation were measured. The results revealed a strong positive correlation between teachers' autonomy support and children's intrinsic motivation. In another classroom study, Deci, Schwartz, Sheinman and Ryan (1981b) found that children of more controlling teachers scored lower on measures of mastery orientation and perceived competence than children in classrooms of more autonomy-supportive teachers. In addition to showing less interest in learning and challenge, they reported lower self-esteem than children exposed to autonomy-supportive teachers. Similar findings have been observed in sport (e.g., Pelletier, Fortier, Vallerand, & Brière, 1998) and PE settings (Goudas et al., 1995).

The study of Ryan (1982) provided support for the effects of intrapersonal events on intrinsic motivation. He conducted an experiment with college students performing hidden-figure puzzles. Participants were randomly assigned to an ego-involving situation by being told that performance reflected creative intelligence, or to a task-involving condition where only task instructions were given. It was hypothesised that participants in the ego-involving condition would pressurise themselves in an internally controlling manner since their self-esteem hinged on the outcome of their performance. As predicted, ego-involved participants displayed significantly less intrinsic motivation in a subsequent free-choice period than those in the task-involved condition. In addition, the ego-involved participants also reported higher tension and pressure than the task-involved participants. However, conflicting evidence has been provided by the findings of Butler (1992) in that ego involvement

did not undermine intrinsic interest on a drawing task. In addition, perceived competence and intrinsic interest were positively correlated in the ego-involved condition but not in the task-involved condition. These results indicate that the effects of achievement goals on intrinsic motivation require further investigation.

To examine the effects of ego-involving (performance) goals on intrinsic motivation relative to task-involving (mastery) goals, Rawsthorne and Elliot (1999) conducted a meta-analysis on a total of 23 experimental studies published between 1971 and 1997 involving 52 effect sizes. The results showed that, in general, ego-involvement has an undermining effect on free-choice intrinsic motivation ( $d = -.17$ ) as well as on self-reported interest ( $d = -.12$ ). These effect sizes were relatively small due to the fact that the magnitude and direction of the effect varied across studies. For example, Koestner, Zuckerman, and Koestner (1989) found a positive effect of ego-involvement on free-choice intrinsic motivation ( $d = .30$ ) whereas Ryan, Koestner, and Deci (1991) found a strong negative effect of ego-involvement on intrinsic motivation ( $d = -.81$ ). Rawsthorne and Elliot suggest that the inconsistencies regarding the relation between ego-involvement and intrinsic motivation could be due to the induction of ego-involvement (ego involvement versus normative performance goals), the type of performance feedback given (confirming versus non-confirming feedback), or performance goals held by participants (performance-approach versus performance-avoidance goals). Again, this points to the need for further research on the effects of goals on intrinsic motivation.

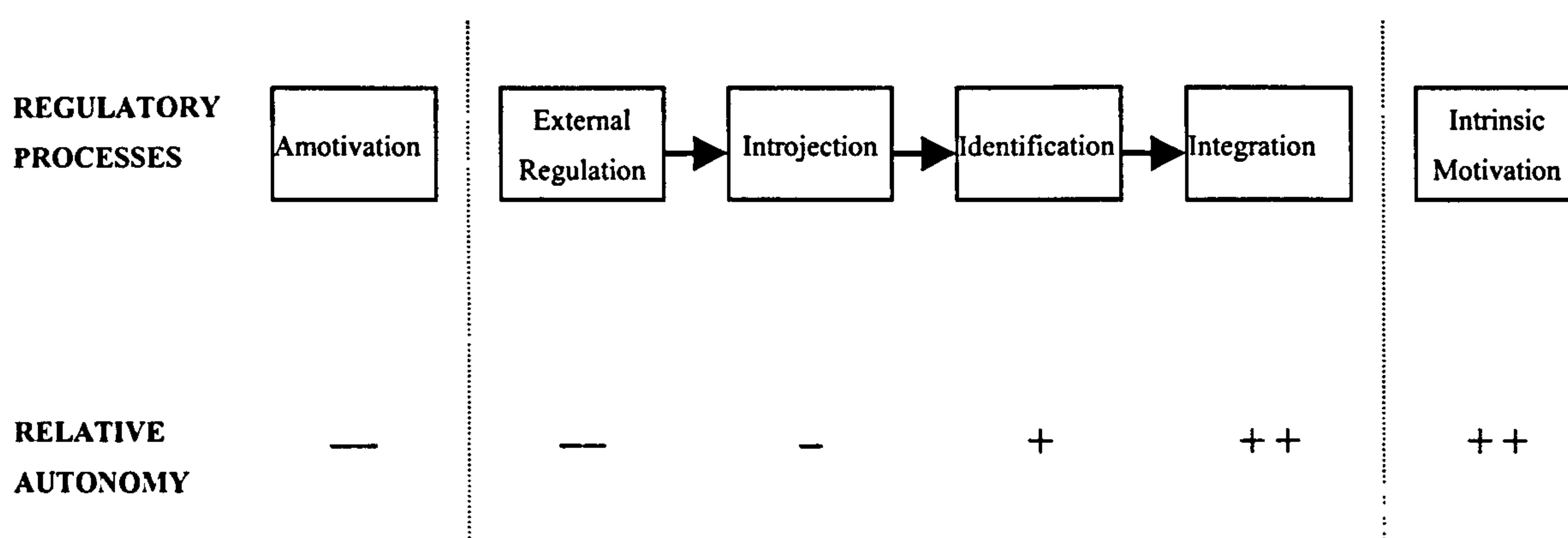
In summary, CET has highlighted how social-contextual events can facilitate intrinsic motivation by supporting or satisfying people's need for autonomy and competence. Conversely, if these needs are not supported, intrinsic motivation will be undermined. However, Ryan and his colleagues (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000a, 2000b) stress that CET only applies to activities that hold intrinsic interest for a person. For activities that are not interesting to an individual, the principles of CET are not applicable. In order to address issues on the nature of extrinsic motivation, another sub-theory of SDT called Organismic Integration Theory (OIT) was proposed.



### 2.4.1 Self-Regulatory Processes of Extrinsic Motivation

Deci and Ryan (1985) suggested that extrinsic motivation could vary according to its degree of self-determination. For example, certain activities in the classroom or PE may not be interesting to students in the first instance but they have to participate. OIT was developed to deal with the processes through which behaviours that are regulated externally can be acquired or 'taken in' by the individual and transformed into a more self-determined regulation. This process is described as 'internalisation' and it involves a shift from an external to internal locus of causality (Deci & Ryan, 1991), as individuals try to rationalise the behavioural outcomes relevant to their need satisfaction. That is, the more internalised a behavioural regulation, the more it will be experienced as autonomous (Ryan & Connell, 1989).

Deci and Ryan (1985) have linked the concept of internalisation to that of extrinsic and intrinsic motivation. They suggest that there are four main types of behavioural regulations located on the intrinsic-extrinsic continuum, each one reflecting a qualitatively different 'reason' for acting out the behaviour in question (see Figure 2.1). They are external, introjected, identified, and intrinsic forms of regulation. It should be noted that Deci and Ryan (1985) also included integrated regulation as the most self-determined form of extrinsic motivation in the continuum. However, this regulation is mainly found in the adult population and since this thesis deals with young people, therefore it is not discussed here.



**Figure 2.1:** Schematic Illustration of the Different Styles of Behavioural Regulation.

External regulation is the least self-determined form of extrinsic motivation and it refers to behaviour that is controlled by external means, such as rewards or external authority. Children who participate in PE lessons because they want to avoid punishment from their teachers is an example of external regulation.

Introjected regulation refers to behaviour that is internally controlled or self-imposed, such as acting out of feelings of guilt avoidance, or to attain ego-enhancements such as pride, and is characterised by feelings of 'ought', 'should', or 'must'. A child saying "I must exercise in order to feel good about myself" might illustrate this form of regulation. This represents an incomplete internalisation of a regulation because although the reasons for acting have been internalised, they are not truly self-determined.

For identified regulation, the behaviour is a more self-determined form of extrinsic motivation, acting according to one's choice or values. It is characterised by feelings of 'want' rather than 'ought'. For example, a child says "I want to exercise to improve my fitness" exemplifies identified regulation. Although the activity is performed for an extrinsic reason (i.e., to improve fitness), it is internally regulated and self-determined.

Finally, intrinsically motivated behaviour is behaviour that is undertaken solely for its own sake or enjoyment. When one says, "I play soccer because I enjoy it" is an example of intrinsic motivation. This is the highest level of self-determination whereby the behaviour is emanating fully from the self.

These four behavioural regulations can be viewed as a continuum ranging from highly internal to highly external in the following order: intrinsic, identified, introjected and external. Using the Perceived Locus of Causality scale (PLOC), Ryan and Connell (1989) showed that the four types of behavioural regulations were correlated according to a simplex-like or ordered correlation structure, supporting the underlying continuum of autonomy. Accordingly, a composite relative autonomy indicator called the Relative Autonomy Index (RAI) can be computed by weighting

each sub-scale. Positive scores indicate more autonomous regulation and negative scores indicate more controlling regulation.

In addition to these four behavioural regulations, a state of amotivation exists where the person's behaviour has no personal causation and no intention to act. Amotivated people perceive a lack of contingency between their own actions and outcomes, or a lack of competence. Consequently, amotivation also occupies a separate category at the external end of the continuum.

Research has shown the motivational benefits of more self-determined behavioural regulations in classroom (e.g., Connell & Wellborn, 1991; Grolnick & Ryan, 1987; Ryan & Connell, 1989; Vallerand & Bissonnette, 1992), as well as in physical activity contexts with young people (Chatzisarantis, Biddle, & Meek, 1997; Goudas et al., 1994a). In Ryan and Connell's (1989) study, external and introjected regulations in school children were related to anxiety and maladaptive behaviour when faced with failures. On the other hand, identified regulation and intrinsic motivation were positively related to enjoyment and effort. Chatzisarantis et al. (1997) examined intentions to participate during leisure-time exercise with regard to both autonomous and controlling intentions in a group of school children. Results showed that autonomous intentions (want to) predicted physical activity but not controlling intentions (have to).

Research has begun to examine contextual events that support or inhibit the internalisation process. Deci, Eghrari, Patrick, and Leone (1994) suggest that three contextual factors promote internalisation. They are: providing a meaningful rationale, acknowledging the actor's perspective, and communicating choice rather than control. Providing a rationale that is meaningful to the actor can help the individual to understand the value of doing the activity. Acknowledgement of conflict helps to reduce internal pressure and also conveys respect from the actor's perspective (relatedness). Finally, the rationale and acknowledgement need to be presented in an autonomy-supportive way rather than in a controlling manner.



To test the above hypothesis, Deci et al. (1994) carried out a 2 x 2 x 2 factorial design experiment with 192 undergraduates randomly assigned to one of the eight experimental conditions (6 cells with either one or two facilitating factors and 2 cells with all three facilitating factors or none). The results showed that when the social context supported self-determination (as represented by all three or two facilitating factors), it promoted greater internalisation than the more controlling contexts (one or zero facilitating factors).

#### **2.4.2 Operationalising Intrinsic and Extrinsic Motivation**

There are two common methods used in the measurement of intrinsic motivation. In basic experimental research, intrinsic motivation has been operationalised as the amount of time spent on the target activity in a free-choice period. In a typical experiment using this approach, the participants are exposed to the task under different conditions, such as receiving feedback or not. Following this, they are told that they will not be asked to do the task any more. Usually, the participants are left alone for a period of time with some other alternative activities. The time they spend on the experimental task during this free-choice period is unobtrusively observed and serves as an indication of intrinsic motivation. It is assumed that there is no extrinsic reason to do the task during the free-choice period because no reward or feedback is given. Therefore, the more time they spend on the task, the more intrinsically motivated they are for that task. This type of assessment has been used extensively. However, a recent study by Ryan et al. (1991) indicates that caution needs to be taken using the free-choice paradigm, because it can also reflect extrinsic motivation (internally controlling persistence). Moreover, it is only appropriate in experimental studies.

Another common way to measure intrinsic motivation is through the use of self-reports of enjoyment and interest of the target activities. In experimental studies, task-specific measures are usually used (e.g., Ryan, 1982). Several questionnaires have been designed specifically to tap into intrinsic motivation by assessing experiences of enjoyment, interest, and feelings of competence for field studies (e.g., Harter, 1981; Ryan, 1982). For instance, based on Ryan's (1982) work, McAuley et

al. (1989) developed the Intrinsic Motivation Inventory (IMI) to assess intrinsic motivation in the context of sport and exercise. The IMI consists of four sub-scales assessing the degree to which an activity is experienced as enjoyable and interesting (Enjoyment/Interest), perceived competence (Competence), perceived exerted effort in the activity and the importance placed on it (Effort/Importance), and the reported tension and pressure experienced during the task (Pressure/Tension). The first three sub-scales are considered positive aspects of intrinsic motivation, while Pressure/Tension is considered as a negative indicator. McAuley et al. (1989) proposed, on the basis of hierarchical confirmatory factor analysis, that the four sub-scales represent first-order factors, and intrinsic motivation represents the second-order factor. Thus, the total score of the IMI can be taken as an indication of intrinsic motivation. However, several authors have highlighted two major problems associated with the IMI (Markland & Hardy, 1997; Vallerand & Fortier, 1998). First, the results of the confirmatory factor analysis presented by McAuley et al. (1989, 1991) indicated poor fit of the hierarchical model to the data (GFI = .788, RMSR = .136, NFI = .760, in 1989 study, and AGFI = .824, GFI not reported, RMSR = .075, NFI = .87, in 1991 study). Generally, the fit indexes of above .90 are considered acceptable and residual indexes of lower than .10 are seen as satisfactory. Other than the problem with factor validity of the scale, the authors also highlighted a theoretical issue. That is, other than assessing a dimension closely related to intrinsic motivation (i.e., enjoyment/interest), IMI also assesses its determinants (e.g., perceived competence) and its consequences (e.g., effort). This may lead to incorrect interpretation of the research findings involving intrinsic motivation and its antecedents and outcomes. For example, CET proposes that changes in perceived locus of causality and perceived competence have a causal effect on intrinsic motivation. Therefore, perceived competence should not be treated at the same conceptual level and should not be used as an indicator of intrinsic motivation (Markland & Hardy, 1997). Since IMI lacks validity in assessing intrinsic motivation, the use of self-reports of enjoyment is a better choice.

One limitation of self-report measures is that participants may confuse their enjoyment of the reward, or enjoyment of the setting in which they are rewarded, with their enjoyment of the task itself. Since both free-choice paradigm and self-reports

measures have their pros and cons, the best way is to use both measures if possible. Only when the two measures correlate within experimental conditions is intrinsic motivation evident (Ryan et al., 1991). Hence, future studies should consider measuring both free-choice behaviour and self-reported interest/enjoyment concurrently and report that correlations.

Since motivation can be viewed as a multidimensional phenomenon and is linked to the process of internalisation, another type of instrument has been designed to measure the different forms of motivation toward an activity. In addition, the degree of internalisation of a given set of behavioural regulations can be determined. In this perspective, motivation is operationalised as the perceived reasons for participation and is measured through assessing individual's perceived locus of causality.

Ryan and Connell (1989) have developed the Academic Self-Regulation Questionnaire (ASRQ) to assess the reasons for engaging in school-related behaviours (such as doing homework) in a group of young children. The ASRQ consists of four sub-scales reflecting four behavioural regulations, external, introjected, identified and intrinsic, showing that the four types of behavioural regulations were correlated according to a simplex-like or ordered correlation structure, supporting the underlying continuum of autonomy or a gradient of autonomy. The ASRQ has been used mainly in classroom and prosocial domains (Ryan & Connell, 1989). Recently, it has also been used in sport and physical activity domains (e.g., Goudas et al., 1994a).

Recently, Vallerand and his colleagues (Blanchard & Vallerand, 1996a, 1996b; Brière, Vallerand, Blais, & Pelletier, 1995; Fortier, Vallerand, Brière, & Provencher, 1995) have also developed the Sport Motivation Scale (SMS), a similar instrument to the ASRQ to measure the different types of motivation. The SMS consists of seven sub-scales: intrinsic motivation 'to know', intrinsic motivation 'to accomplish', intrinsic motivation 'to experience stimulation', identified regulation, introjected regulation, external regulation, and amotivation. The reliability and construct validity, as well as the simplex structure of the scale, have been supported



through various studies (Brière et al., 1995; Li & Harmer, 1996; Pelletier et al., 1995). This measure is specific for sport and its target population is college students.

### Summary

In summary, the research on SDT points to the importance of the needs of autonomy, competence and relatedness in influencing motivated behaviours. Therefore, social contextual conditions that provide support for these three needs are likely to facilitate feelings of intrinsic motivation and the process of internalisation. One limitation of the SDT approach is that research tends to focus on intrinsic motivation and extrinsic motivation as dichotomous variables. From this review, it has been shown that motivation can be viewed as varying in degrees of self-determination, along a self-determination continuum. However, very few studies have examined the impact of different motivational orientations on the cognitive, affective and behavioural outcomes of individuals, particularly in the physical activity domain. The inclusion of motivational orientations in the study of achievement goals may enhance the predictions of motivated or amotivated behaviour. For example, mastery oriented individuals are predicted to show adaptive motivational patterns according to achievement goal theory. However, if improvement or mastery of the task is regulated by introjection (e.g., avoiding guilt), this will be considered as controlling and may lead to maladaptive motivational patterns. Therefore, if both theories are considered simultaneously, it could enhance the prediction of behaviour. In addition, it will be interesting to look at the different combinations of goals, perceived competence, and autonomy of individuals in influencing cognitive, affective and behavioural outcomes. These issues will be addressed in Chapter 5 (Study 3) of this thesis.

From the meta-analysis conducted by Rawsthorne and Elliot (1999), there appears to be some inconsistent findings in the research between goals and intrinsic motivation, resulting in the small negative effect size of ego-involvement on intrinsic motivation. Further research needs to be conducted to test this relationship directly. The first study in Chapter 7 will examine this issue.

In addition, the interplay between goal involvement (task versus ego) and integration of regulation processes (autonomy-supportive versus controlling) remains unexplored in physical activity. For example, what happens if an ego-involved person is placed in an autonomy-supportive environment whereby the rationale for competing in the activity is given, his/her internal conflict is minimised through acknowledgment, and he/she is given the choice to participate in the competition? Conversely, what will happen to a task-involved person when placed in a controlling environment? The second experiment in Chapter 7 will deal with these research questions.

## **2.5 Research Questions to be Examined**

The five studies in this thesis sought to examine the role of athletic ability beliefs, achievement goals, and intrinsic motivation specifically in PE settings. One reason for focusing on PE is because psychological research in PE has been limited (Fox & Biddle, 1988). In addition, PE represents a unique setting where there are elements from the classroom as well as from sport. For example, there are skills teaching where students are being evaluated but the competitive nature of sport is also often embedded in these activities. Furthermore, PE also involves nearly 100% of the age group that the sample is drawn from, which reflects a good representative sample of the population.

Given the emphasis of achievement goal theory in understanding the cognitive, affective and behaviour outcomes in educational contexts, little is known about the antecedents of adopting such goals. The starting point of this thesis, therefore, is to examine the links between conceptions of sport ability and the adoption of goals, as proposed by Sarrazin et al. (1996). In order to study the constructs of conceptions of ability, a valid measurement tool needs to be established. The CNAAQ, developed by Sarrazin et al. (1996), requires further testing in terms of its psychometric properties.

Previous studies that have used the CNAAQ to examine athletic ability beliefs of young people (Biddle et al., 1999a; Lintunen et al., 1999; Sarrazin et al., 1996) showed that some sub-scales in the CNAAQ were psychometrically weak (e.g., Specific and Stable in Biddle et al., 1999a). Moreover, no study has yet to confirm the factorial validity of the measurement model. As such, Study 1 sought to examine the psychometric properties of the CNAAQ. Both qualitative and quantitative methods were used. In addition, this study examined the relationships between athletic ability beliefs, goal orientations, perceived competence and intentions to be physically active using structural equation modelling. This study extended on previous research by using the two beliefs, namely entity and incremental, as two higher-order factors corresponding to the theory proposed by Dweck and her colleagues (Dweck & Leggett, 1988).

Given the use of a relatively small sample and the exploratory nature of Study 1, Study 2 further examined the psychometric properties of the revised version of the CNAAQ and its invariant factor structure across gender and age using a large sample. In addition, the relationships between sport ability beliefs and goal orientations in predicting amotivation were tested in this study with perceived competence as a moderator. Given that little is known about amotivation, the exploration of this construct can shed light on why young people do not participate in sport or physical activity.

Study 3 was designed to examine the interrelationships between sport ability beliefs, achievement goals, perceived competence, motivational orientation and amotivation. Specifically, this study identified the motivational profiles of young people by drawing from different theoretical perspectives to provide a better understanding of young people's motivation toward physical activity. Given that no study has concurrently examined these important motivational variables in terms of intraindividual differences, this type of study can provide valuable information to guide educators and researchers in the prediction of motivational patterns in young people.



Study 4 linked to the first two studies of the thesis in that it examined the causal relationship between athletic ability beliefs and goal involvement. The notions that entity beliefs lead to the adoption of ego goals, and incremental beliefs lead to the adoption of mastery goals have not been extensively dealt with in the physical domain. There is a need to test the directions of influence specifically in sport and physical activity contexts. In addition, this study also examined the impact of beliefs on cognition, affect and behaviour when faced with failure.

Finally, Study 5 consisted of two experiments. The first examined the effects of goal involvement on enjoyment and intrinsic motivation under conditions of positive feedback. Using both self-reports and behavioural measures of intrinsic motivation, this study attempted to shed light on the inconsistent findings of previous research on the effects of goal involvement on intrinsic motivation. Experiment 2 of this study further confirmed the findings of the first experiment. In addition, the effects of goal involvement and communication styles on intrinsic motivation were examined simultaneously. This study extended on previous research by using manipulation checks to ensure the success of the manipulations, and looking at goal involvement in the context of autonomy-supportive versus controlling communication styles.

## **CHAPTER III**

### **Study 1**

#### **The Conceptions of the Nature of Athletic Ability Questionnaire for Children: Evidence on Psychometric Properties and its use in Predicting Physical Activity Intention**

##### **3.1 Introduction**

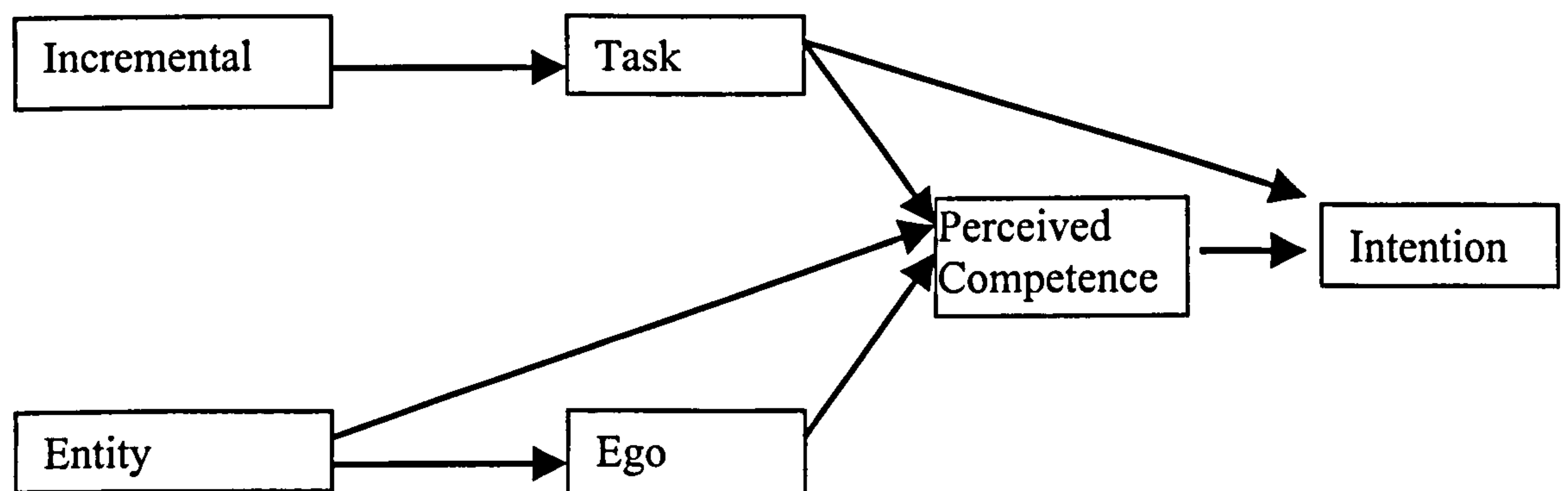
From the literature review in the previous chapter, studies that employed the Conceptions of the Nature of Athletic Ability Questionnaire (CNAAQ) developed by Sarrazin et al. (1996) have provided some evidence of the proposed relationships between sport ability beliefs and adoption of different goals (Biddle et al., 1999a; Lintunen, et al., 1999; Sarrazin et al., 1996). That is, sport ability seen to be stable over time, general across sports, and as a gift is associated with the adoption of an ego goal. In contrast, task orientation is positively associated with the beliefs that sport ability is seen as changeable, a product of learning and specific to certain sports. However, these studies also indicated that there were some problematic items and sub-scales in the original CNAAQ [e.g., Stable and Specific sub-scales in Biddle et al.'s (1999a) study]. Therefore, there is a need to examine further the validity and reliability of the CNAAQ.

##### **3.2 Purposes of the Research**

Drawing from the limited studies conducted in the physical domain, the purpose of the present study was two fold. The first was to investigate the psychometric properties of the CNAAQ. Both qualitative and quantitative methods

were used to ‘triangulate’ findings. The second purpose is to replicate and extend the model proposed by Biddle et al. (1999a) with a UK sample in predicting intention to be physical active. From Chapter 2, it was found that little is known about the role of goals in predicting behavioural intentions. Therefore, examining these links may enhance our understanding of motivated behaviour.

In Biddle et al.’s (1999a) study consisting of 723 Hungarian youth, the subscales Stable and Specific were found to have low reliabilities and thus were not included in their analyses. In the present study, entity and incremental beliefs were modelled as second-order factors instead of first-order factors. The use of the two higher order factor is theoretically consistent with Dweck’s proposal of implicit beliefs (Dweck & Leggett, 1988). Figure 3.1 shows the proposed links between conceptions of sport ability, goal orientations, perceived competence and intention to be physically active.



**Figure 3.1:** Proposed model of the relationships between conceptions of sport ability, goal orientations, perceived competence, and intention to be physically active.

According to the study of Sarrazin et al. (1996), it was found that incremental beliefs were positively associated with task orientation whereas entity beliefs were related to ego orientation. However, the directions of influence between goals and beliefs were not tested. Dweck and her colleagues posit that implicit beliefs are likely to determine goal orientations (Dweck & Leggett, 1988). Therefore, it was hypothesised that incremental beliefs will predict task orientation, and entity beliefs



will predict ego orientation. It was also hypothesised that goal orientations directly affect perceived competence, which in turn influences intention to be physically active. Although the link between task orientation and perceived competence may not be in accord with theoretical predictions of Nicholls (1989), previous studies (Biddle et al., 1999a; Lintunen et al., 1999) have found that task orientation indirectly predicts intention through perceived competence. These authors have explained that this link may be due to the way perceived competence is measured. People can interpret competence in a self-referenced way, as well as normatively. Since this study used the same measure of perceived competence (PSPP-PC; Fox & Corbin, 1989). The same link is predicted. In addition, it was also hypothesised that the relationship between intentions and entity beliefs is mediated by perceived competence, that is, those entity theorists with high perceived competence should have higher intention to be physical active compared to those with low perceived competence. Finally, based on prior theorising and research, it is logical to expect a high incremental belief will be associated with high intention to be physically active through task orientation (Biddle et al., 1999a).

### **3.3 Psychometric Properties of the CNAAQ**

In stage 1 of psychometric development, interviews with athletes were conducted to explore their conceptions of athletic/sport ability. This was to examine the extent to which the constructs measured in the CNAAQ are salient in young people's minds. The second stage involved a content analysis to test the face validity of the instrument. Finally, the information gathered from the first two stages was used to test the factor structure of the instrument in which six measurement models were compared.

#### **3.3.1 Stage 1: Interviews**

This stage of the study aimed to understand how young people think about their conceptions of sport ability. In order to gain insight into individuals' experience,

the primary tool chosen was one-to-one interview. This method allows the researcher and the interviewee to clarify for each other the meaning of their dialogue. According to Lincoln and Guba (1985), this process helps in gathering sufficient knowledge to lead to an understanding about a person's experience. The focus of the interview was to explore how young people think about their sport ability and to examine whether the constructs used in the CNAAQ measure the experience of young people appropriately. If certain constructs are not salient in the thought processes, then a questionnaire containing that construct may not be meaningful in representing the perception of the respondents.

To improve the trustworthiness of the research, one small pilot study was conducted with three trained PE teachers with at least three years teaching experience in secondary schools. The purposes of the pilot were to check the appropriateness of the interview questions and to develop the researcher's interviewing skills. Initially, a list of eight questions was formulated for the interview. After feedback from the participants in the pilot study, it was decided to use one general question with elaboration probes. Subsequently, an interview guide was developed (see Appendix 1). In addition, member's feedback was provided through an experienced qualitative researcher. This additional step was taken to ensure that the raw data had been analysed accurately.

### **3.3.1.1 Method**

#### **Participants**

The sample consisted of eight male sports participants who were primarily involved with the sport of basketball, but they played other sports as well. Players were aged between 13 to 14 years and represented their county (area) team. This group provided maximum variation among children in this age group. All the players had at least three years experience in playing basketball and spent a minimum of six hours per week playing or training. The sample represented 'information-rich cases' (Patton, 1990) because of their achievements in sport at a young age, and they were able to report first hand information on the focus of inquiry, that is, they were able to articulate their conceptions of sport ability more easily than other children. However, it is only a small and relatively homogeneous sample and data should be seen as

exploratory and preliminary only. Results should only be judged alongside the other analyses in this study.

### Interviews

The chief coach of the county team was approached for permission to conduct the interviews. The players were invited to take part in the study. The interviews were scheduled before a practice session when all the players were available, and they were conducted in a quiet room away from the basketball court. A tape recorder was used to record each interview, which lasted for 15 to 20 minutes. Before the interview, each participant was given a brief introduction to the purpose of the study. Confidentiality was assured, and permission for recording the interview was sought from each participant. During the interview, field notes were taken. An interview guide consisted of one general question (What you think about your sport ability?) and elaboration probes (e.g., how do you feel?) were used during the interviews (Appendix 1). In addition, participants were also asked about their ability in other sports.

#### **3.3.1.2 Results and Discussion**

The interviews were recorded and subsequently transcribed. Content analysis was used to analyse the data. This is a qualitative approach that identifies themes and patterns in the data. Specifically, it is based on an inductive analysis to identify common themes or patterns of greater generality (Gould, Tuffey, Udry, & Loehr, 1996).

From the analysis, all the players rated their playing ability as high. The way they perceived their ability was based on normative comparisons rather than self-referenced. For example, "I am quite good ... because I think I scored the most points in the league". In addition, many of them felt that they could improve further with training and practice, hard work and effort put in during training sessions and at their own time. They appeared to know what specific training to work on in order to overcome their weaknesses. For example, one player mentioned that he practiced 200 shootings on three-pointer every day. Two of them mentioned that they worked on fitness training such as running and jumping. In general, all the participants felt that



their sport abilities were developed through training and practices. They believed that hard work and effort were required for them to improve to a higher level.

These results suggested that this group of young boys endorsed incremental beliefs. On the other hand, four players mentioned that they believed that they were born with certain talents in basketball. For example, one of them commented, “I think you just get it, whether you are good at something or not”. Some of them suggested that their height and body build were strong innate qualities that helped them to reach their present level. These results appeared to lend support to the presence of an entity belief in young athletes.

When these players were asked about their sport ability in other sports, similar responses were gathered. The results of the interviews pointed towards two main types of beliefs about sport ability, namely incremental and entity beliefs, for young sport participants. There is some evidence for young people to adopt high incremental beliefs and it is also very likely for a person to endorse both beliefs. None of the interviewees referred to generality and specificity dimensions of the CNAAQ.

### **3.3.2 Stage 2: Content Analysis**

The purpose of this stage was to test the face validity of the CNAAQ through a content analytic method (Weber, 1990). Face validity refers to the extent to which scales appear to measure what they claim to measure (Kline, 1993).

#### **3.3.2.1 Method**

##### **Participants**

39 Year 10 school pupils, aged 14 to 15 years, from a community college in the Midlands participated in this phase of the research. There were 20 boys and 19 girls from two intact PE classes. Participation was voluntary and the participants were told that they could withdraw from the study at anytime. Because the study involved normal school curriculum time, it was considered appropriate for the school Headteacher to give informed consent for participation.

## Procedures

Definitions of the six constructs measured in the CNAAQ (Stable, Gift, General, Improvement, Learning, and Specific) were provided. The participants were asked to classify each of the CNAAQ items into the six categories. A seventh category was labelled 'none' which would indicate items not adequately described by any of the categories (Appendix 2). The participants were also advised to classify an item into more than one category if they thought it was appropriate. The purpose of the content analysis was to check that items would have a larger percentage of 'correct' classifications in the expected factor than in other factors. A baseline of 70% in the expected factor was set for an item to be appropriate.

### **3.3.2.2 Results and Discussion**

The proportion of items meeting the 70% criterion were three out of the four items for 'learning', 'stable' and 'gift', and two out of three for 'general' and 'specific'. All items for the 'improvement' sub-scale met the criterion (See Table 3.1 in bold).

Based on these results, problematic items were identified. For example, for the item "how good you are at sport is something which you can improve only with difficulty" (Stable item 3), the majority of students thought that this assessed learning or incremental beliefs. Another example was the item "someone who is good at sport succeeds in any sport" (General item 3) was interpreted as a belief in 'gift' or 'specific' by some students. Five items were identified as inadequate in describing the factors they were designed to measure, and this information was used in the later stage of analyses when different models are compared.

**Table 3.1: Results of Content Analysis on CNAAQ (Frequency in Parentheses)**

Subscale	Qns	Item	Gift	Stable	General	Learning	Incremental	Specific	None
Gift	2	To be successful in sport you need to have a natural aptitude, to be born with it.	66.67% (26)	7.7% (3)	2.56% (1)			2.56% (1)	20.51% (8)
	7	You need to have a certain "gifts" to be good at sports.	97.5% (39)			2.5% (1)			
	12	To be good at sports, you need to be born with the basic qualities, which allow you success.	83.3% (35)	2.38% (1)	7.14% (3)	4.76% (2)			2.38% (1)
	18	To be good at sport you need to be naturally gifted.	92.5% (37)		7.5% (3)				
Stable	1	We have a certain level of ability in sport and we cannot really do much to change that level.		100% (39)					
	5	Even if you try, the level you reach in sport will change very little.		76.9% (30)	7.7% (3)	5.13% (2)	10.26% (4)		
	11	How good you are at sport is something which you can improve only with difficulty.	4.88% (2)	36.58% (15)	2.44% (1)	26.83% (11)	14.63% (6)	2.44% (1)	12.20% (5)
	17	It is difficult to change how good you are at sport.		72.5% (29)	7.5% (3)	7.5% (3)		7.5% (3)	5.00% (2)
General	4	If you are good at sport, you are good at all sports, even if they are very different.	7.5% (3)	2.5% (1)	85% (34)	5% (2)			
	10	In principle, if you are good at one sport you are good at almost all sports (even if they are quite different).		7.7% (3)	87.18% (34)		2.56% (1)	2.56% (1)	
	16	Someone who is good at sport succeeds in any sport.	10.26% (4)		66.67% (26)	7.69% (3)		7.69% (3)	7.69% (3)



Table 3.1: Cont.

Subscale	Qns	Item	Gift	Stable	General	Learning	Incremental	Specific	None
Learning	3	To be successful in sport you need to learn techniques and skills, and practice them regularly.			4.54% (2)	84.1% (37)	9.09% (4)	2.27% (1)	
	8	You need to learn and to work hard to be good at sport.		7.14% (3)	7.14% (3)	71.43% (30)	14.29% (6)		
	13	To reach a high level of performance in sport, you must go through periods of learning and training.		2.27% (1)	2.27% (1)	70.45% (31)	15.91% (7)	6.82% (3)	2.27% (1)
	21	It's by learning and by hard work that you can succeed and be good at sport.		2.17% (1)	4.34% (2)	63.04% (29)	28.26% (13)		2.17% (1)
Incremental	9	In sports, if you work hard at it, you will <u>always</u> get better.	2.38% (1)		2.38% (1)	23.81% (10)	71.43% (30)		
	15	How good you are at sports will <u>always</u> improve if you work at it.	2.13% (1)		4.26% (2)	19.15% (9)	72.34% (34)	2.13% (1)	
	20	If you put enough effort into it, you will <u>always</u> get better at sport.		4.34% (2)	4.34% (2)	21.7% (10)	69.56% (32)		
Specific	6	The same person can be good at one sport but not good in other sports.	5% (2)	5% (2)	5% (2)	2.5% (1)		87.5% (35)	
	14	It is not unusual for someone who is good at one sport to experience difficulties in other sports.	4.88% (2)		7.32% (3)	2.44% (1)	2.44% (1)	73.17% (30)	9.76% (4)
	19	You can be very good at one sport and have problems with other sports.	10.00% (4)	7.5% (3)	7.5% (3)	2.5% (1)	5.00% (2)	67.50% (27)	

### 3.3.3 Stage 3: Tests of factorial validity of the CNAAQ

This stage of the analysis examines the factorial validity of the CNAAQ via the use of confirmatory factor analysis. In order to determine factorial validity, the internal reliability, convergent validity, and discriminant validity need to be examined (Kline, 1993). Confirmatory factor analysis is regarded as the most rigorous method for inferring factorial validity. Information gathered in the previous two stages, as well as theoretical considerations, were used in formulating six different models. These models were compared to select the best representation of the measurement model.

#### 3.3.3.1 Method

##### Participants

Participants, drawn from four schools in the East Midlands, were 352 school pupils ranging from 14 to 19 years (mean = 15.9 years, SD = 1.05 years). There were 218 males and 134 females. Because the study involved normal school curriculum time, it was considered appropriate for the school Headteacher to give informed consent for participation.

##### Procedures

After securing permission from the headteachers, the heads of the Physical Education departments were contacted. Students were told that their participation in the study was voluntary and they were free to withdraw at any time and were assured that their responses would be kept confidential. All students gave informed consent and took 15 minutes to complete a battery of questionnaires administered at the beginning of their physical education lessons. Only results of the CNAAQ will be reported here.

##### Measures

*Sport Ability Beliefs.* The original English version of the 'Conceptions of the Nature of Athletic Ability Questionnaire' (CNAAQ; Sarrazin, et al., 1996) was employed to determine school pupils' beliefs about sport ability. The six sub-scales consist of: Stable (4 items, e.g., 'we have a certain level of ability in sport and we cannot really

do much to change that level’); Gift (4 items, e.g., ‘to be successful in sport you need to be born with the basic qualities which allow you success’); General (3 items, e.g., ‘if you are good at one sport, you are good at all sports, even if they are very different’); Learning (4 items, e.g., ‘you need to learn and to work hard to be good at sport’); Improvement (3 items, e.g., ‘how good you are at sport will always improve if you work at it’); Specific (3 items, e.g., ‘the same person can be good at one sport but not good in other sports’). The Improvement sub-scale has been labelled ‘Incremental’ by Sarrazin and colleagues. However, to avoid confusion with the higher order Incremental factor, the Improvement label was adopted in the present study (Biddle et al., 1999a). All responses were made on 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree).

### 3.3.3.2 Results and Discussion

Confirmatory factor analysis (CFA) was conducted on the CNAAQ to examine its factorial validity using EQS for Windows 5.7 (Bentler & Wu, 1998). Six competing measurement models were hypothesised:

- a two-factor model (Model 1) with two first-order factors (Incremental and Entity) with original 21 items;
- a six first-order model (Model 2) with original 21 items;
- a hierarchical model (Model 3) comprising six first-order factors (Learning, Improvement, Specific, Gift, Stable, and General) and two higher-order factors (Incremental and Entity) with original 21 items;
- a two-factor model (Model 4) with two first-order factors (Incremental and Entity) with 12 items, that is, without General and Specific sub-scales and 3 problematic items (Stable 3, Learning 4, and Gift1);
- a four first-order model (Model 5) with 12 items, without General and Specific sub-scales and 3 problematic items (Stable 3, Learning 4, and Gift1);
- a hierarchical model (Model 6) comprising four first-order factors (Learning, Improvement, Gift, and Stable) and two higher-order factors (Incremental and Entity) with 12 items, without General and Specific sub-scales and 3 problematic items (Stable 3, Learning 4, and Gift1).



Models 1 and 4 were based on Dweck's work using just two beliefs at first-order level, whereas models 2 and 5 were closely related to the proposals of Sarrazin et al.'s (1996) multidimensional view of ability. Models 3 and 6 combined Dweck and Sarrazin et al.'s work with incremental and entity beliefs as second-order higher factors. In addition, convergent validity and discriminant validity were tested. Convergent validity refers to the degree to which measures hypothesised to indicate the respective constructs actually load highly on the construct (Bagozzi & Kimmel, 1995). It is suggested that convergent validity is best tested with the use of CFA (Bentler & Bonnet, 1980). Discriminant validity refers to the extent to which measures of different sub-scales are different from each other (Bagozzi, 1981).

In the initial examination of the data, there was evidence of multivariate non-normality in the distribution. Although all the univariate statistics had skewness and kurtosis values between + 2 and - 2, Mardia's coefficient was 107.45 and the Normalised estimate was 32.43, indicating multivariate nonnormality (Bentler, 1995). Consequently, the Robust Maximum Likelihood method, which controls for the overestimation of chi-square, underestimation of adjunct fit indices, and underestimation of errors, was used (Hu & Bentler, 1995).

The following indices of fit provided by EQS were examined to evaluate the adequacy of the models: Satorra-Bentler scaled chi-square statistic; the comparative fit index (CFI); the robust comparative fit index (Robust CFI); the goodness-of-fit index (GFI); the adjusted goodness-of-fit index (AGFI); root mean square residual (RMSR); root mean square error of approximation (RMSEA). The CFI assesses the lack of fit as estimated by the non-central chi-square distribution of a target model compared to a baseline model. The robust CFI is more trustworthy than the CFI when the multivariate normality distribution assumption is not met (Bentler, 1995). GFI and AGFI are indices of absolute fit, that is, the relative amount of the observed variances and covariances accounted for by a model. AGFI adjusts the GFI by taking into account the number of estimated parameters in the model (Tabachnick & Fidell, 1996). Typically, for these fit indices, .90 or above is suggested to indicate a good fit to the data (Hu & Bentler, 1995). However, more recent analyses suggest that such a

cut-off may be too low. Hu and Bentler (1999), in reference to the CFI and other fit indices, say “although it is difficult to designate a specific cut-off value for each fit index ... a cut-off value close to .95 ... seem to result in lower Type II error rates (with acceptable costs of Type I error rates)” (p. 27).

The RMSR is the square root of the mean of the squared discrepancies between the implied and the observed covariance matrices. The RMSEA is also based on the analysis of residuals and compensates for the effects of model complexity. For these two values, below .10 is often thought to indicate a good fit to the data. Hu and Bentler (1999) recommend a cut-off “close to .06” (p. 27) for RMSEA.

Table 3.2 shows the overall fit indices for the six hypothesised models. In general, all indices of fit indicated that the data fit was better in Models 2, 5 and 6. Furthermore, Models 5 and 6 fit the data better than Model 2. Therefore, Models 5 and 6 were compared further in the next step of the analysis.

Table 3.3 details the factor loadings and the measurement errors for each item in Models 5 and 6. Based on the high factor loadings on the two higher order factors (.77 to .88 for Entity and .86 to .91 for Incremental; see Table 3.4), the existence of the two higher order uncorrelated factors was supported ( $r = -.17$ ,  $p < .05$ ). Therefore, the hierarchical model (Model 6) is accepted on the basis of being a more parsimonious model compared to Model 5. Cronbach’s alpha coefficients showed that both Entity ( $\alpha = .74$ ) and Incremental ( $\alpha = .80$ ) scales were internally consistent.

The relatively high loadings (above .50) and low error variances (below .87) of the items and factors for Model 6 indicated in Table 3.3 and Table 3.4, together with the goodness-of-fit indices, indicate that convergent validity has been achieved. This is shown by the items hypothesised to indicate their respective factors (i.e., Entity and Incremental) loading highly on these factors. Measures of each factor shared significant amounts of common variance.

**Table 3.2: The Fit Indices for the Six Alternative CFA Models**

Fit Index	Model 1 (2 Fs) 21-items	Model 2 (6-1 <sup>st</sup> order Fs) 21-items	Model 3 (Hi-8 Fs) 21-items	Model 4 (2 Fs) 12-items	Model 5 (4-1 <sup>st</sup> order Fs) 12-items	Model 6 (Hi-6 Fs) 12-items
Scaled $\chi^2$	492.61	261.06	307.90	136.31	82.97	89.78
df	188	174	184	53	48	51
$\chi^2/df$	2.62	1.50	1.67	2.57	1.73	1.76
CFI	.788	.923	.900	.891	.948	.944
Robust CFI	.808	.945	.922	.900	.958	.953
GFI	.842	.919	.906	.926	.954	.951
AGFI	.806	.893	.882	.891	.924	.924
RMSR	.071	.056	.063	.054	.040	.044
RMSEA	.080	.050	.056	.077	.056	.057

Note: Fs = Factors; Hi = Hierarchical; CFI = Comparative Fit index; Robust CFI = Robust Comparative Fit Index; GFI = Goodness-of-fit Index; AGFI = Adjusted Goodness-of-fit Index; RMSR = Root Mean Squared Residuals; RMSEA = Root Mean Square Error of Approximation.

**Table 3.3: First Order Standardised Loadings for Model 5 and Model 6**

Scale	$\alpha$	Item	Model 5	Error Variance	Model 6	Error Variance
Stable	.57	1	.48	.87	.50	.87
		5	.57	.83	.56	.83
		17	.62	.78	.62	.78
Gift	.75	7	.66	.75	.66	.75
		12	.69	.72	.69	.73
		18	.78	.63	.78	.62
Improvement	.77	9	.69	.72	.69	.72
		15	.76	.65	.77	.64
		20	.73	.69	.73	.69
Learning	.66	3	.66	.76	.66	.75
		8	.60	.80	.58	.81
		13	.62	.78	.62	.78



**Table 3.4: Second Order Loadings of the Sub-scales of CNAAQ (Model 6)**

	Entity	Error Variance	Incremental	Error Variance
Stable	.77	.64		
Gift	.88	.47		
Improvement			.86	.50
Learning			.91	.41

To test for discriminant validity, the confidence interval of the correlation between Entity and Incremental beliefs was calculated. The correlation was - .32 (standard error .075, upper bound confidence interval -.02). Since the correlation was significantly less than unity, discriminant validity is supported (Bagozzi, 1981).

In this stage of the study, six models were proposed according to the theorising of Dweck and Leggett (1988) and Sarrazin et al. (1996), as well as the findings from the previous two stages. Using confirmatory factor analysis, it was found that the hierarchical model with four first-order factors and two higher-order factors (Model 6) showed the best fit to the data. Convergent validity and discriminant validity were supported with internal consistency for the model. It is concluded that the original 21-item CNAAQ should be revised to a 12-item inventory labelled as CNAAQ-2.

### **3.4 Predicting Physical Activity Intention**

The second aim of this study was to examine the relationships between conceptions of sport ability, goal orientations, perceived competence and intention to be physically active using structural equation modelling.

#### **3.4.1 Method**

##### **Participants**

The sample was the same sample used in stage 3.

## Measures

In addition to the CNAAQ (Sarrazin et al., 1996), the following instruments were used (Appendix 3):

*Goal Orientations.* Students' dispositional goal orientations were assessed by using an established English version of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Whitehead, 1998). The stem for the 13 items was 'I feel most successful in sport/PE when...'. The reason for using sport/PE instead of PE alone was because English students normally considered PE as activities conducted in the gymnasium and sports referred to outdoor games, such as rugby and netball. Participants were reminded that sport/PE encompassed all physical activities taken in school PE classes. There were 7 items measuring task orientation (e.g., 'I learn a new skill and it makes me want to practise more') and 6 items measuring ego orientation (e.g., 'I can do better than my friends'). Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Perceived Competence.* Six Sport Competence items from the Physical Self-Perception Profile (PSPP, Fox & Corbin, 1989) were adapted by modifying the four-point structured alternative format to a 5-point Likert scale ranging from 1 (this is not at all like me) to 5 (this is very much like me) to make consistent with the rest of the measures. An example item is: 'some people feel that they are good when it comes to playing sport'.

*Intention to Exercise During Leisure Time.* Two items were used to measure intention to exercise during leisure time. The students were asked whether they planned to play sport or exercise three times a week for the next two weeks and whether they intended to play sport or exercise three times a week for the next two weeks. These measures of intention were assessed on a 5-point scale from 1 (very unlikely) to 5 (very likely).

### 3.4.2 Results

#### Descriptive Statistics and Gender Differences

Table 3.5 shows the descriptive statistics for the variables used in the structural equation modelling. The means and standard deviations for the overall sample, and males and females separately, are presented. A one-way MANOVA was conducted to determine significant differences between males and females on the variables (gender as independent variable and the six main scales as dependent variables). The results showed a significant main effect for gender [Wilks'  $\Lambda = .77$ ,  $F(6, 345) = 17.44$ ,  $p < .001$ ]. Analyses of variances (ANOVA) of each dependent variable were conducted as follow-up tests to the MANOVA. Type I error, which can be caused by multiple comparisons was controlled using the Bonferroni adjustment ( $p = .0083$ ). The follow-up tests indicated that males scored higher in Ego Orientation ( $F = 20.92$ ,  $p < .001$ ), Entity Beliefs ( $F = 13.54$ ,  $p < .001$ ), Perceived Competence ( $F = 80.84$ ,  $p < .001$ ), and Intention ( $F = 28.05$ ,  $p < .001$ ) than females. However, it should be noted that the effect sizes were small for Ego, Entity, and Intention ( $\eta^2$  below .07, see Table 3.5). Effect size is an indication of the degree to which the null hypothesis is false (Cohen, 1988).

**Table 3.5: Means and SD of the Main Scales**

	Overall (N= 352)		Male (N= 218)		Female (N= 134)		Effect Size
	Mean	SD	Mean	SD	Mean	SD	$\eta^2$
1.Task	3.80	0.63	3.84	0.63	3.73	0.62	.01
2.Ego	2.82	0.88	2.98	0.86	2.55	0.85 <sup>***</sup>	.06
3.Entity	2.66	0.67	2.76	0.72	2.50	0.52 <sup>***</sup>	.04
4.Incremental	3.86	0.64	3.90	0.68	3.79	0.56	.01
5. Perc. Comp	3.02	0.75	3.28	0.64	2.61	0.74 <sup>***</sup>	.19
6.Intention	3.95	1.09	4.18	0.93	3.57	1.22 <sup>***</sup>	.07

Note: Perc. Comp = perceived competence; gender differences; <sup>\*\*\*</sup>  $p < .001$ .



Cronbach's alpha coefficients for the scales were all satisfactory (above .74; see Table 3.6). Pearson's correlation coefficients (see Table 3.6) revealed that Task and Ego Orientations were positively correlated in a small way, the correlation being higher for females than males. Task Orientation was also positively associated with Incremental Beliefs and Perceived Competence and Intention, and negatively associated with Entity Beliefs. The relationships were similar for both sexes. Ego Orientation was positively correlated with Entity in the male sample, but not in the female sample. For both genders, Task and Ego orientations and intention were positively related to Perceived Competence (see Table 3.7 and Table 3.8).

**Table 3.6: Internal Consistency Coefficients (Alpha) and Pearson's Correlation Coefficients of the Main Scales (Total Sample)**

	$\alpha$	1	2	3	4	5
1.Task	.82					
2.Ego	.84	.30**				
3.Entity	.74	-.16**	.14**			
4.Incremental	.80	.42**	.11*	-.12*		
5.Perceived Competence	.79	.33**	.29**	.15**	.19**	
6.Intention	.87	.38**	.18**	-.05	.21**	.46**

Note: \*  $p < .05$ , \*\*  $p < .01$ .

**Table 3.7: Pearson's Correlation Coefficients of the Main Scales for Males**

	1	2	3	4	5
1.Task					
2.Ego	.18**				
3.Entity	-.16*	.19**			
4.Incremental	.42**	.07	-.13		
5.Perceived Competence	.32**	.16*	.18**	.19**	
6.Intention	.31**	.04	-.10	.13*	.32**

Note: \*  $p < .05$ , \*\*  $p < .01$ .

**Table 3.8: Pearson's Correlation Coefficients of the Main Scales for Females**

	1	2	3	4	5
1.Task					
2.Ego	.48**				
3.Entity	-.24*	-.10			
4.Incremental	.43**	.14	-.17		
5.Perceived Competence	.35**	.30**	-.11	.15	
6.Intention	.46**	.23**	-.13	.26**	.46**

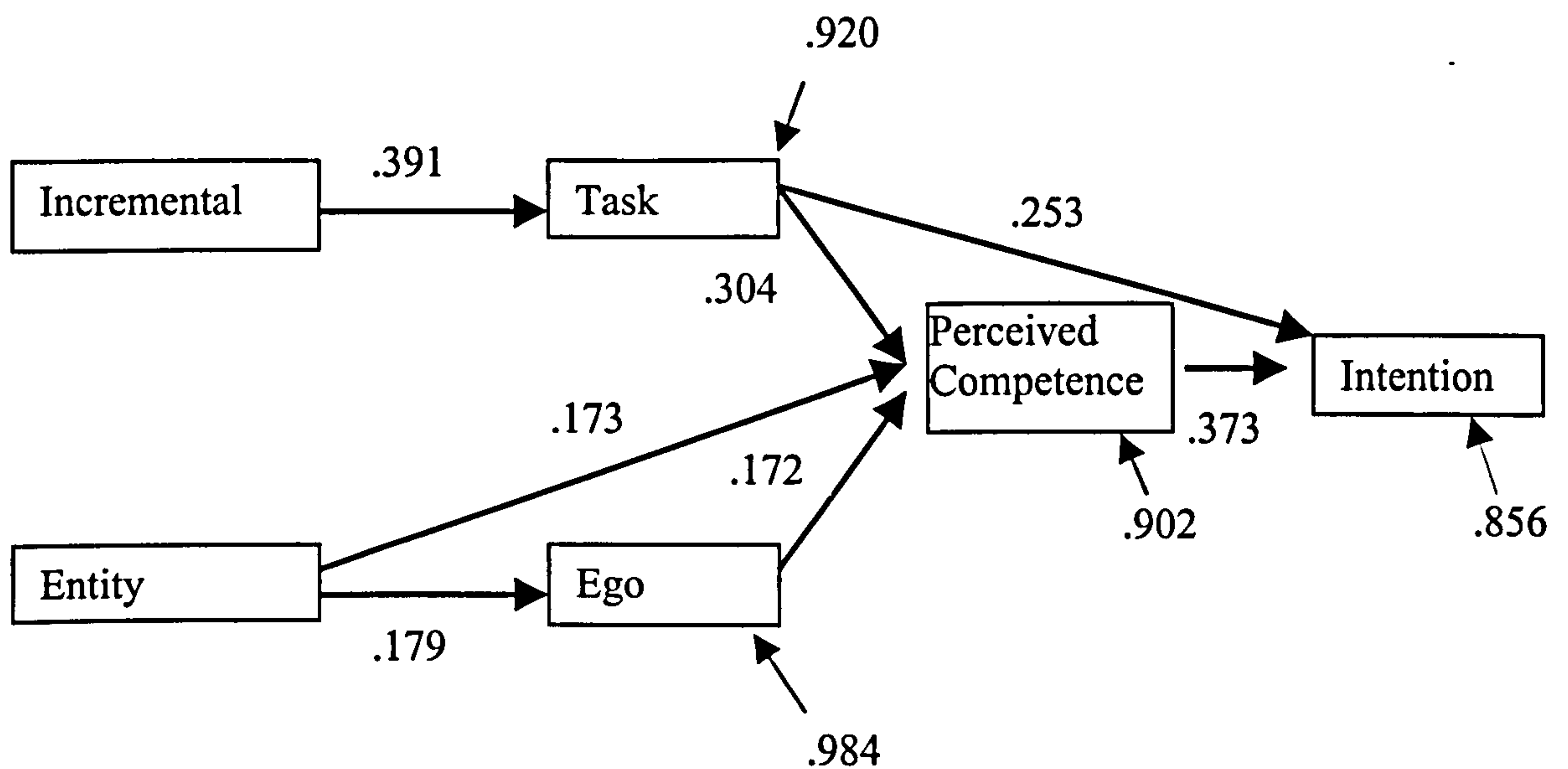
Note: \*  $p < .05$ , \*\*  $p < .01$ .

### Structural Equation Analysis

The network of relationships between pupils' sport ability beliefs, goal orientations, perceived competence and intention to be physically active (see Figure 3.1) was examined through structural equation modelling (SEM) using latent variables. The chi-square statistic and the degrees of freedom are presented in addition to the indices of fit: CFI, GFI, AGFI, RMSR, and RMSEA.

Results indicated a good fit of the model to the data ( $\chi^2 = 16.12$ ,  $df = 6$ ,  $\chi^2/df = 2.69$ ,  $CFI = .966$ ,  $GFI = .985$ ,  $AGFI = .948$ ,  $RMSR = .031$ , and  $RMSEA = .069$ ). In addition, model modifications can be investigated through the use of the Wald and Lagrange Multiplier (LM) Tests. The Wald test assesses whether any free parameters of a model can be restricted without substantial loss of information (Bentler, 1995). The LM test tests the opposite, that is, whether any parameters that were set to zero in the model are, in fact, not zero. It tests the effect of adding free parameters to a model (Bentler, 1995; Byrne, 1994). It is suggested that although these post-hoc modifications are influenced by chance, the information can be useful in providing insight to variations of the hypothesised model. Changes are usually advised only when theoretically or logically justified (Byrne, 1994).

The Wald Test did not suggest any parameters be dropped from the model but the LM Test revealed that if paths linking incremental beliefs to ego orientation, and entity beliefs to task orientation are added, significant improvement in the model's fit would result. However, adding these two paths could not easily be justified on theoretical grounds, so it was decided that the paths would not be added. The standardised solutions and error variances of the hypothesised model are shown in Figure 3.2. The results of the present findings provide support for the model proposed by Biddle et al. (1999a) and predicted 26.7% of the variance in intention.



**Figure 3.2:** Standardised solution for the proposed model of the relationships between conceptions of sport ability, goal orientations, perceived competence, and intention to be physically active.

### 3.4.3 Discussion

The final stage of this study replicated and extended the model proposed by Biddle et al. (1999a) utilising a UK sample. Instead of using the four sub-scales, 'general', 'gift', 'learning', and 'improvement', the present study used the two higher-order entity and incremental factors derived from the findings of previous stages of research to examine the relationships between conceptions of athletic ability, goal orientations, perceived competence and intention to be physically active. The results provided support for the hypothesised model.



Task orientation is best predicted by an incremental belief, that is, a belief that sport ability can be improved as a result of learning and practice. An entity belief predicts ego orientation. These findings are consistent with previous studies (Biddle et al., 1999a; Lintunen et al., 1999; Sarrazin et al., 1996). In addition, intention to be physically active is predicted by goal orientations through perceived competence and directly by task orientation.

Two possible misspecifications of the model indicated by the LM Test were suggested. Although post-hoc modifications improve the fit of the model, it is not recommended due to the small sample size and without strong theoretical justification (Hoyle & Panter, 1995). However, the information suggested by the post-hoc tests can be informative in guiding future research. Specifically, the LM Test suggested that if paths linking incremental beliefs to ego orientation, and entity beliefs to task orientation, were added, the fit of the model would improve significantly. Further analyses were carried out and it was found that there is a small positive relationship between incremental beliefs and ego orientation, and a small negative association between entity beliefs and task orientation. This seems to suggest that students who believe that they can improve their sport abilities may wish to adopt normative comparison process to assess their improvement. This may not be the case for students who have entity beliefs, as the result suggests that they are unlikely to adopt a task orientation. Nevertheless, these are merely speculations based on the post-hoc modification tests. Further investigations of these relationships are needed.

### **3.5 Conclusions from Study I**

In summary, the main purpose of this study was two-fold. First, the purpose was to assess the psychometric properties of the CNAAQ and, second, was to test a model of the relationship between conceptions of sport ability, goal orientations, perceived competence and intention. Interviews in Stage 1 provided a preliminary

insight into young people's conceptions of their sport ability. It was found that the two proposed types of beliefs did exist. An incremental belief, similar to that proposed by Dweck and Leggett (1988), was shown to exist in the physical domain. Here one believes that sport ability is a changeable quality that can be developed as a result of training and practice. On the other hand, one may believe that in order to be successful in sport, one has to be born with certain qualities. This also emerged from the interviews and is similar to the entity theory proposed by Dweck and Leggett. These results lend partial support to the proposals of Sarrazin et al. (1996) and suggest that further study is warranted. However, beliefs referring to specificity and generality of sport ability did not emerge. These factors are not part of Dweck and Leggett's theory and may constitute different belief structures or not be salient to young people's ability beliefs. Although the interviews were preliminary, the results were consistent with other findings. There appears sufficient doubt about their inclusion in an assessment instrument, as supported in the confirmatory factor analysis. The model comparison in Stage 3 supported the view that models omitting these sub-domains represented the data much better than models including general and specific beliefs. Based on this triangulation of the data, omitting these beliefs appears to be justified.

The content analysis procedure in Stage 2 helped to identify five items that were problematic in terms of face validity. In the third stage, six measurement models were compared. Using confirmatory factor analysis, it was revealed that the hierarchical model with four first-order factors and two higher-order factors (Model 6) provided the best fit to the data. Consequently, for further analysis, it is recommended that the CNAAQ be reduced to a 12-item inventory with three items measuring each sub-scale (Stable, Gift, Learning and Improvement) from Model 6. Convergent validity and discriminant validity were supported together with internal consistency. To distinguish the new scale from the CNAAQ developed by Sarrazin et al. (1996), it will be labelled the CNAAQ-2.

In the final stage of this study, the relationships between conceptions of sport ability, goal orientations, perceived competence and intention to be physically active were examined. The results were consistent with previous research in that task orientation is best predicted by an incremental belief whereas an entity belief predicts

ego orientation (Biddle et al., 1999a; Lintunen et al., 1999; Sarrazin et al., 1996). In addition, intention to be physically active is predicted by goal orientations indirectly through perceived competence, and directly by task orientation. In general, the findings of this study found consistent pattern according to the theoretical predictions in that task orientation is associated with more adaptive motivational patterns (Dweck & Leggett, 1988; Nicholls, 1989). The effects of ego orientation on motivational intention were found to be mediated by perceived competence. Ego-oriented individuals with high perceived competence had higher intention to be physically active compared to those with low perceived competence. This again, is in accordance to the predictions of achievement goal theory (Dweck & Leggett, 1988; Nicholls, 1989).

Consistent with previous goal perspectives research, it was highlighted that task orientation was positively associated with perceived competence and intention to be physically active. The links between implicit beliefs and goal orientations suggest that PE teachers can promote task orientation by focusing on the incremental aspects of physical ability, rather than the view that physical ability is fixed or a gift. It is important for PE teachers to know the implications of implicit beliefs on students' behaviours. If teachers foster a conception of ability as an entity, this is likely to promote an ego orientation, thus students may be concerned with the adequacy of their ability compared to others. Goal perspectives research had shown that this tendency to compare with others is not likely to encourage positive beliefs, emotions and behaviour in the long term. As a result, the students may miss the opportunities for learning and improvement of their ability (see Chapter 2).

Finally, there are limitations in this study which need addressing in future research. First, although the development of the CNAAQ-2 was derived through the use of multiple methodology and the results are encouraging, the sample size in this study is relatively small. Further investigation of the psychometric properties of the CNAAQ-2 is required in order to substantiate the new instrument. Second, it is not known whether the instrument operates differently for different gender and age groups. It would be worthwhile to collect data with a larger sample so that the invariant factor structure of the measurement tool across gender and age can be tested.



Third, this study did not look into the different goal profile groups, which may differ in their beliefs about the nature of sport ability. There is evidence that the entity and incremental beliefs may not be related in a bipolar manner. Therefore, it would be of interest to investigate the differences between goal profile groups and beliefs or the interaction effects of the two. Finally, this was a cross-sectional study and therefore the direction of causality cannot be confirmed. Prospective, longitudinal and experimental studies are needed to support the causal links between implicit beliefs and other motivational variables. In the next chapter, the first two limitations of this study will be addressed.

## **CHAPTER IV**

### **Study 2**

## **Invariant Factor Structure of the CNAAQ-2 and the Prediction of Amotivation**

### **4.1 Introduction**

In Study 1, the development and testing of the hierarchical CNAAQ-2 were outlined. In this investigation, the invariant factor structure of the measurement model across gender and age was not tested due to the small sample size. In psychological research, the issue of measurement invariance in the development of a measurement tool is an important concern for researchers (Byrne, 1994; Li, Harmer, Chi, & Vongjaturapat, 1996). Firstly, there is a need to establish a consistency with respect to the relationship between the construct (e.g., a belief in the stable nature of physical ability) under study and its corresponding indicators (e.g., items measuring a stable belief) across different populations (e.g., age, gender, ability). In other words, the measurement items should be equally valid across different groups. Secondly, the factor structure of the measurement tool needs to be cross-validated across independent samples of the same population. As the CNAAQ-2 is a newly developed inventory, there is a need to further examine the factor structure and to test its generalisability across different samples (Marsh, 1993) in order to be confident in the results of subsequent analyses.

### **4.2 Purposes of the Research**

The first aim of the present study was to test the psychometric properties of the CNAAQ-2 using a new and larger sample of young people. The invariant factor structure of the measurement model across gender and age was examined. The second

aim was to study the network of relationships between athletic ability beliefs, goal orientations, perceived competence, and amotivation.

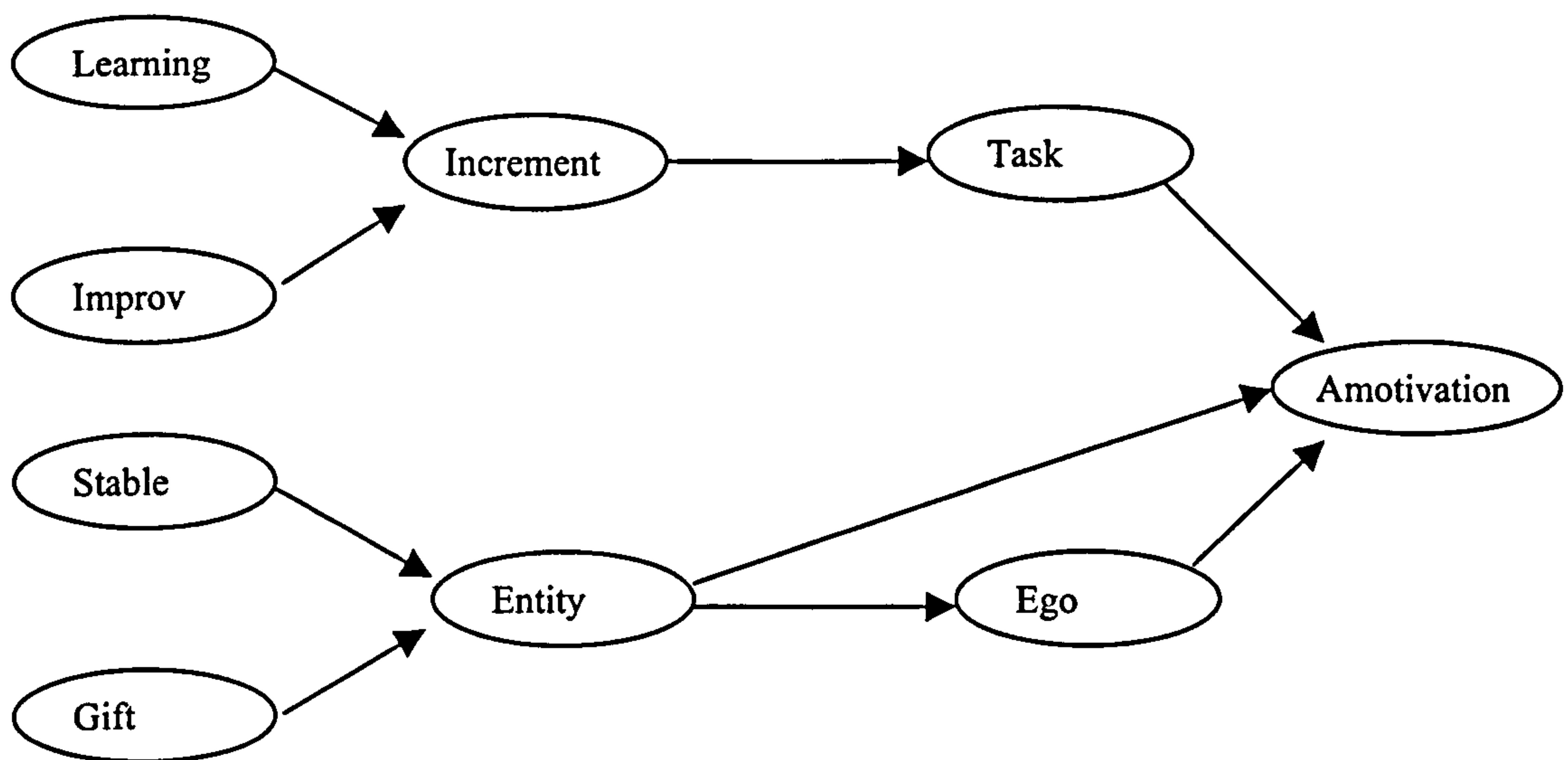
Amotivation is an important construct to study as an outcome variable in the context of youth physical activity. There is concern that too few youth are active enough for health gains, and further work is required in identifying correlates of physical activity motivation (Biddle et al., 1999b). Vallerand and Fortier (1998) suggest that the study of amotivation “may prove helpful in predicting lack of persistence in sport and physical activity” (p. 85). Amotivation refers to the relative absence of motivation where a lack of contingency between actions and outcomes is perceived and reasons for continuing involvement cannot be found (Pelletier et al., 1995; Vallerand & Fortier, 1998). This lack of perception of control over environmental forces is what Deci and Ryan (1985) refer to as amotivation at the ‘external boundary’ and is seen as similar to feelings of helplessness (see Chapter 2).

The relationship between achievement goals and motivational variables has been well documented (Duda, 1993; Nicholls, 1989), especially with intrinsic motivation (see Chapter 2). However, self-reported amotivation, which is at the opposite end of the motivational continuum according to self-determination theory (Deci & Ryan, 1985; 1987), has not been the specific focus of studies in the physical domain. Therefore, the hypothesised relationship between goals and amotivation is based on the opposite effects of intrinsic motivation. That is, task orientation will be negatively associated with amotivation whereas ego orientation may be positively associated for those holding low perceptions of competence, and negatively associated with amotivation for those with high perceptions of competence. Some researchers have suggested that according to this theoretical assumption, perceived competence should have a moderating effect between ego orientation and behaviour (Butler, 1999; Kaplan & Midgley, 1997). The present study will therefore examine the role of perceived competence as a moderating influence on young people’s motivation.

Based on the literature reviewed in Chapter 2 and the findings in Study 1, it was hypothesised that entity beliefs would be underpinned by stable and gift beliefs,



and incremental beliefs underpinned by learning and improvement beliefs. In turn, entity and incremental beliefs will predict ego and task goal orientations respectively. Both goal orientations are hypothesised to be associated with amotivation and, based on theorising by Dweck (Dweck & Leggett, 1988; Dweck et al., 1995), amotivation is also predicted by entity beliefs. A full latent model with full indicators was tested. For clarity, only the latent factors are presented in Figure 4.1.



**Figure 4.1.** Proposed full latent model of the relationships between conceptions of sport ability, goal orientations and amotivation.

Note: Increment = Incremental; Improv = Improvement.

### 4.3 Psychometric Properties of the CNAAQ-2

#### 4.3.1 Method

##### Participants

The study involved 2969 pupils (1566 girls and 1403 boys) from 49 schools in England. The pupils were aged 11 to 15 years (mean = 12.93, SD = 0.89) attending classes in Years 7, 8 and 9. Good representation of all socio-economic levels and ethnicity in England is believed to have been achieved although this was not tested.

Pupils were randomly sampled within age and gender groups and were from schools taking part in a larger project.

### Procedure and Measures

Questionnaires (Appendix 4) were administered by trained research assistants in quiet classroom conditions. The following instruments were used:

*Achievement Goal Orientations.* Students' dispositional task and ego goal orientations were assessed by using an established English version of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Whitehead, 1998). The stem for the 13 items was 'I feel most successful in sport/PE when...'. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Sport Ability Beliefs.* The CNAAQ-2, established from Study 1, was used in this study. Specifically, it contains 12 items measuring four sub-scales: Stable (3 items, e.g., 'we have a certain level of ability in sport and we cannot really do much to change that level'); Gift (3 items, e.g., 'to be successful in sport you need to be born with the basic qualities which allow you success'); Learning (3 items, e.g., 'you need to learn and to work hard to be good at sport'); Improvement (3 items, e.g., 'how good you are at sport will always improve if you work at it'). All responses were made on 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree).

*Amotivation.* Amotivation was assessed by three items modified by Goudas et al. (1994a) from the Academic Motivation Scale (Vallerand et al., 1992; Vallerand et al., 1993). The stem for the items is 'I take part in sport/PE ...'. One example of the item is 'but I really don't know why'. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Perceived Competence.* The six Sport Competence items from the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989) were administered. This scale adopts a structured alternative format whereby participants choose one of two statements that

best describes them and then rates whether it is 'sort of true for me' or 'really true for me'. This produces a 4-point scale ranging from 1 to 4.

### 4.3.2 Results

#### Factor Structure of the CNAAQ-2

Initial inspection of the data resulted 94 cases being deleted due to missing values or outliers. Subsequently, the univariate statistics of the 2875 cases indicated that the values for skewness and kurtosis were within the range of  $-2$  and  $+2$ . Maximum Likelihood was chosen as the appropriate estimation method (Bollen, 1989; Jöreskog & Sörbom, 1988).

Using CFA, the hierarchical model of the CNAAQ-2 was tested. The fit indices were good and better than those in Study 1 ( $\chi^2 = 262.85$ ,  $df = 51$ ,  $\chi^2/df = 5.15$ ,  $CFI = .973$ ,  $GFI = .985$ ,  $AGFI = .977$ ,  $RMSR = .032$ ,  $RMSEA = .038$ ). The internal consistency of the two scales was satisfactory ( $\alpha = .70$  for entity and  $.75$  for incremental). This supports the factorial validity of the hierarchical measurement model of the CNAAQ-2.

The next phase of the analysis involved testing the factorial invariance of the CNAAQ-2 across gender and age through multisample analyses using EQS for Windows 5.7 (Bentler & Wu, 1998). First, the total data set was split by gender and school year with model testing involving fitting the hierarchical model of the CNAAQ-2 to each subgroup separately. Next, the invariance of the model across gender and year group was tested by simultaneously fitting the model to the data for males and females, and subsequently, the three year groups. Table 4.1 details the fit indices of the single group analyses. The baseline models were identical across groups. The fit indices indicated good fit for all groups. These findings support the factor structure of the measurement model for each sample. Subsequently, equality constraints were imposed on all the parameters to be estimated but not on the fixed parameters. These equality constraints included factor loadings, factor correlations, factor variances, measurement errors, and disturbances. Together, these constraints represent a highly restrictive hypothesis for assessing model equivalence in that all the



covariance matrices must be equal (Bentler, 1995). The equivalency of the measurement model between gender and age was then assessed.

**Table 4.1: Initial Fit Statistics by Groups**

Fit Statistics	Male	Female	Year 7	Year 8	Year 9
N	1348	1527	856	981	1034
$\chi^2$ (51)	193.70	138.89	160.49	121.74	138.10
CFI	.962	.977	.944	.975	.973
GFI	.977	.985	.970	.980	.978
AGFI	.965	.977	.954	.969	.967
RMSR	.036	.030	.040	.033	.039
RMSEA	.046	.034	.050	.038	.041

Note: CFI = Comparative Fit index; GFI = Goodness-of-fit Index; AGFI = Adjusted Goodness-of-fit Index; RMSR = Root Mean Squared Residuals; RMSEA = Root Mean Square Error of Approximation.

**Table 4.2: Fit Statistics for Multisample Analyses**

Fit Statistics	Gender	Age
$\chi^2$	449.97	622.39
df	122	194
CFI	.957	.946
GFI	.975	.964
AGFI	.968	.957
RMSR	.039	.057
RMSEA	.031	.028

Note: CFI = Comparative Fit index; GFI = Goodness-of-fit Index; AGFI = Adjusted Goodness-of-fit Index; RMSR = Root Mean Squared Residuals; RMSEA = Root Mean Square Error of Approximation.

Multiple criteria were used to assess the fit of the data to the model, including the chi-square value, CFI, GFI, AGFI, RMSR, and RMSEA. Table 4.2 shows the fit statistics for the test of invariance across gender and age. As indicated, the results provide strong support for the invariance of the CNAAQ-2 measurement model across gender and age.

#### **4.4 Prediction of Amotivation**

The next stage of the analyses examined the relationships between conceptions of sport ability, goal orientations and amotivation, with perceived competence as a moderator. Goal perspectives theory proposes that the influence of achievement goals on subsequent behaviour depends on the level of individuals' perceived competence (Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1989). When task-involved, it was found that adaptive motivational patterns are exhibited regardless of level of perceived competence (Elliot & Dweck, 1988). High ego-involved individuals also displayed similar adaptive patterns when perceived competence was high. However, when ego-involved individuals have doubt over their perceived competence, they were more likely to display maladaptive patterns (Elliot & Dweck, 1988). To examine the relationships between goals and motivation patterns, some researchers argue for the role of perceived competence as moderator rather than mediator (e.g., Kaplan & Midgley, 1997). However, very few studies have examined this moderating effect of perceived competence on goal orientations and motivated behaviour.

To examine the moderating effect of perceived competence on goals and amotivation, the overall sample was split using scores on perceived competence. Given the large sample, it was possible to use more extreme groups in comparison to a mean or median split. In this way, more homogeneous groups can be compared. Consequently, those in the lower quartile were labelled as low perceived competence ('low PC';  $n = 577$ ) and those in the upper quartile as high in perceived competence ('high PC';  $n = 572$ ).

Table 4.3 presents the descriptive statistics and correlations between the variables in each group. A full latent variable model with full indicators was used. The internal consistencies for all main scales were established and were found to be acceptable ( $\alpha$  for task = .76, ego = .83, amotivation = .70, perceived competence = .80).

**Table 4.3: Variable Means, Standard Deviations, and Intercorrelations by Perceived Competence Subgroups**

Variable	M	SD	1	2	3	4	5	6	
<b>High Competence</b>									
1. Task orientation	4.33	.44							
2. Ego Orientation	2.99	.88	.06						
3. Stable	2.35	.75	-.06	.10					
4. Gift	2.41	.97	-.00	.26**	.26**				
5. Learning	4.40	.56	.33**	.07	-.08	.12**			
6. Improvement	4.47	.62	.27**	-.02	-.01	-.11**	.26**		
7. Amotivation	1.49	.56	-.16**	.02	.26**	.01	-.20**	-.07	
Perceived Competence	3.57	.22							
<b>Low Competence</b>									
1. Task orientation	3.83	.60							
2. Ego Orientation	2.50	.87	.10*						
3. Stable	2.66	.82	-.14**	.02					
4. Gift	2.33	.90	-.22**	.14**	.42**				
5. Learning	4.02	.67	.41**	-.05	-.08	-.03			
6. Improvement	3.97	.78	.37**	-.06	-.23**	-.33**	.44**		
7. Amotivation	2.34	.88	-.37**	.02	.30**	.28**	-.24**	-.25**	
Perceived Competence	1.89	.29							

Note: \*  $p < .05$ , \*\*  $p < .01$ .

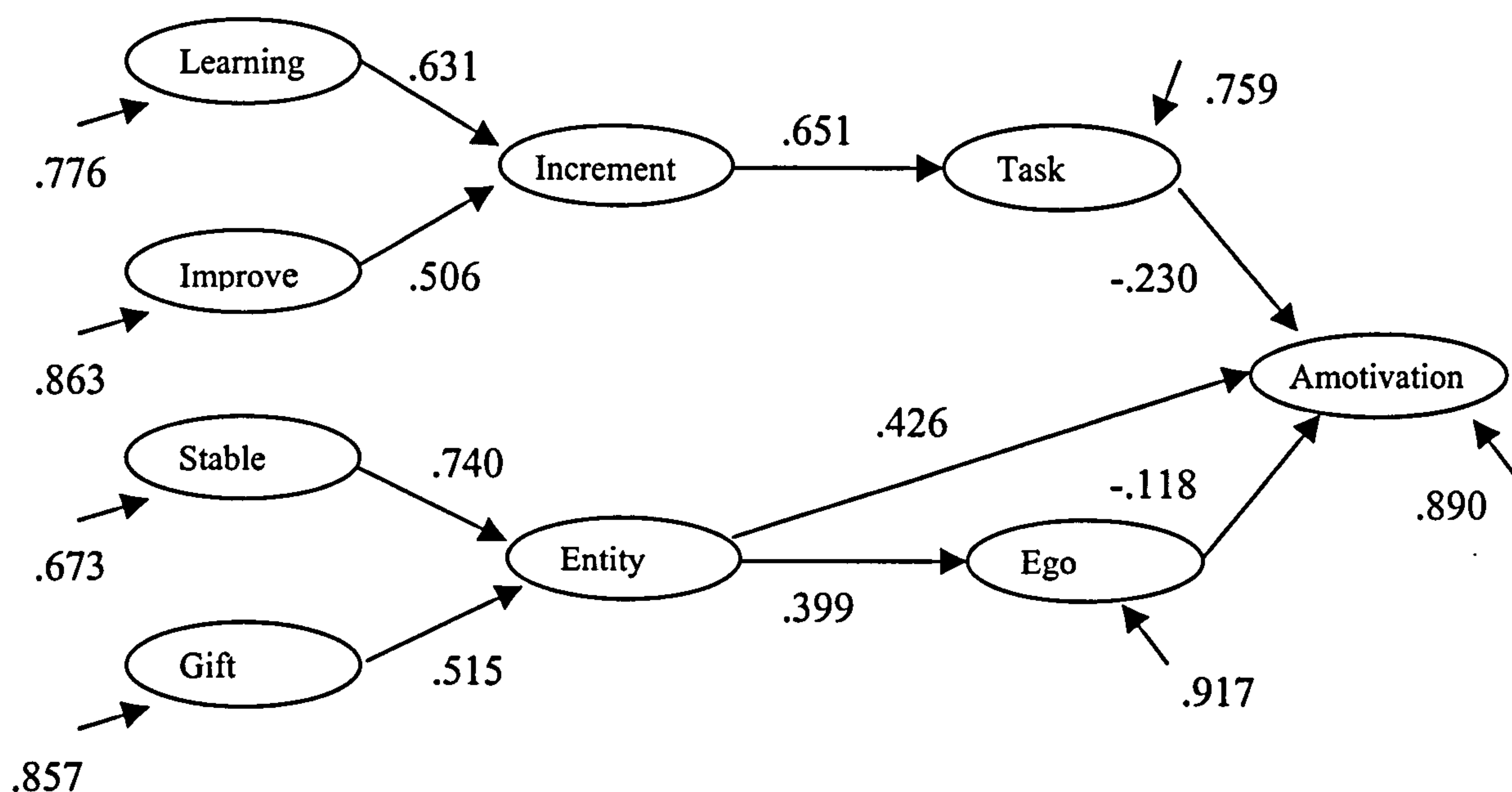


The first analysis was conducted with the high PC group using all the indicators in the full latent model. The fit was acceptable ( $\chi^2 = 696.96$ ,  $df = 340$ ,  $\chi^2/df = 2.05$ ,  $CFI = .904$ ,  $GFI = .920$ ,  $AGFI = .905$ ,  $RMSR = .049$ ,  $RMSEA = .043$ ). However, a closer examination of the univariate statistics showed that 3 items had unacceptable kurtosis values, ranging from 3.54 to 10.73 (items Task 4, Task 7 and Amotivation 3). Subsequent analyses with the low PC group revealed similar results. Since the presence of nonnormal variables may have adverse effect on the results of the analysis (Tabachnick & Fidell, 1996), these items were deleted and the fit of the model to the data was reassessed. Table 4.4 shows the global indices of fit following item deletion for the high and low PC groups. It was found that the fit indices improved as a result. Figure 4.2a and 4.2b present the standardised solutions and error variances for the two groups. For clarity, only the latent factors are shown in the figures.

**Table 4.4: Fit Statistics Following Item Deletion by Groups**

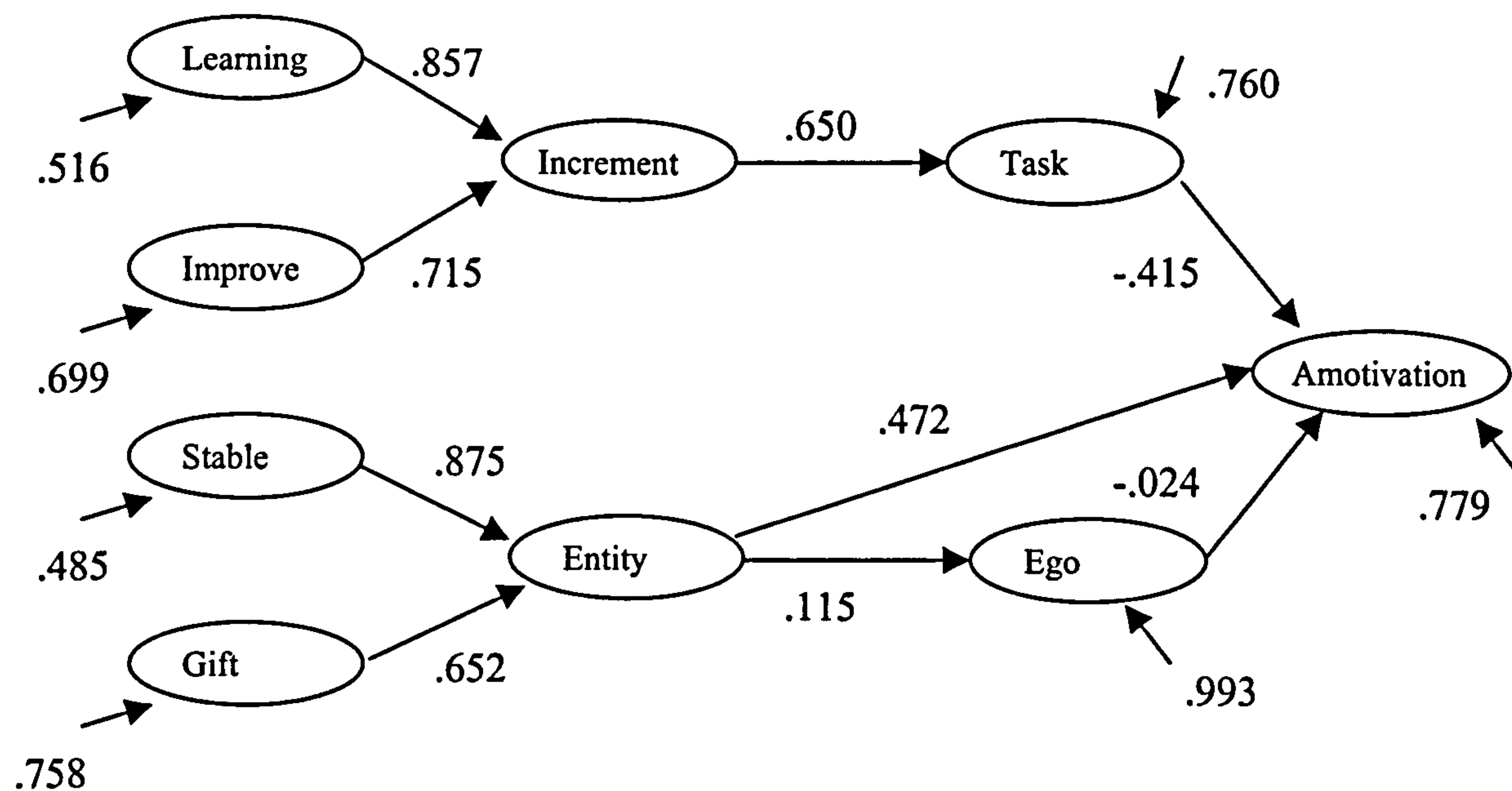
Fit Statistics	High Competent Group	Low Competent Group	Multisample Analysis
$\chi^2$	530.85	670.57	1226.24
df	265	265	538
CFI	.922	.901	.908
GFI	.931	.912	.920
AGFI	.915	.892	.903
RMSR	.052	.064	.067
RMSEA	.042	.052	.033

Note: CFI = Comparative Fit index; GFI = Goodness-of-fit Index; AGFI = Adjusted Goodness-of-fit Index; RMSR = Root Mean Squared Residuals; RMSEA = Root Mean Square Error of Approximation.



**Figure 4.2a.** Standardised solution for the proposed model of the relationships between conceptions of sport ability, goal orientations and amotivation with perceived competence as moderator (High Competent Group).

Note: Increment = Incremental; Improv = Improvement.



**Figure 4.2b.** Standardised solution for the proposed model of the relationships between conceptions of sport ability, goal orientations and amotivation with perceived competence as moderator (Low Competent Group).

Note: Increment = Incremental; Improv = Improvement.

The results of the single group analysis suggest that the hypothesised model fits the high perceived competence group better than the low PC group. To test whether the models of the two PC groups are different from each other, multisample analyses of covariance structure using EQS were conducted. The fit statistics are included in Table 4.4. Based on the equality constraints set on path coefficients on all latent variables and the covariance between incremental and entity beliefs, the LM test suggested that if the constraints on the path coefficients between entity beliefs and ego orientation, and the covariance between incremental beliefs and entity beliefs, were released, significant improvement in fit would result. Single group analyses indicated that path coefficients between entity beliefs and ego orientation for the high and low PC groups were .399 and .115 respectively. Covariances between incremental and entity beliefs, ranged from -.034 for the high PC group to -.456 for the low PC group.

Results suggest that entity beliefs predict ego orientation more strongly for the high PC group compared to those low in perceived competence. In addition, the two implicit beliefs are not related in the high PC group, but are negatively correlated in the low PC group. Finally, more variance in amotivation was accounted for in the low PC group (39.32%) than in the high PC group (20.8%).

## **4.5 Discussion**

One purpose of this study was to further test the factor structure of the CNAAQ-2 with a large sample. The results of the overall sample and single group analyses support the factor structure of the measurement tool. In addition, the multisample analyses showed that the proposed hierarchical model, with two higher-order factors and four first-order factors, was invariant across three age groups and both genders. Thus, support for the CNAAQ-2 is established for gender and three age groups. This suggests that the factor structure of the CNAAQ-2 represents a valid and reliable theoretical construct suitable for the examination of sport ability beliefs among children and youth in their teen years. Confirmation of the two higher-order



factors of entity and incremental beliefs in the model is consistent with the findings in Study 1. The hierarchical model of the CNAAQ-2, therefore, is both justified and recommended for measuring the conceptions of sport ability among young adolescents.

Having established a satisfactory factor structure, it is important to investigate how such beliefs link with other motivational variables because the extent to which such beliefs influence motivated behaviour is still in its infancy. Consequently, the second aim of the study was to test relationships between beliefs and goal orientations in the prediction of self-reported amotivation in the physical education and sport context. Given that perceived competence, according to a goal orientations perspective, is proposed to moderate the effect of ego orientation on motivational processes (Nicholls, 1989), analyses were conducted for youth differing in this construct. Unlike most studies that use a mean- or median-split in separating groups, two 'extreme' groups of perceived competence were created representing the top and bottom quartiles of the distribution.

Results showed that amotivation is predicted directly and indirectly by beliefs and directly by achievement goals. Specifically, entity beliefs were strong and positive predictors of amotivation. Given the early stage of development in the measurement and testing of implicit beliefs in the physical domain, this is an important finding. Believing that athletic ability is a gift and is stable appears to be motivationally maladaptive. One reason for this could be that such perceptions do not allow feelings of confidence and control over future outcomes when competence is perceived to be low. If one feels incompetent and believes that athletic ability cannot change a great deal, feelings of helplessness are likely to ensue when faced with challenges.

Ego goals were rather weakly associated with amotivation, but a task orientation showed quite a strong negative relationship, supporting the motivationally adaptive nature of this goal (Duda, 1993). However, the predicted relationship between ego orientation and amotivation for those low in perceived competence failed to materialise. Although goal orientations theory predicts motivational impairment for

ego-oriented individuals low in perceived competence (Nicholls, 1989), results in the physical domain have been mixed. In a study with quite a large sample ( $n = 1070$ ), Vlachopoulos and Biddle (1997) found no relationships between an ego orientation and perceived success in school physical education for children either high or low in perceived physical ability. One explanation for this draws on early theorising in the field by Nicholls (1984) who distinguished between three types of individuals perceiving their competence to be low. Specifically, some are committed to demonstrate high ability and will tend to choose tasks of moderate or high difficulty. Some lack the commitment to demonstrate high ability, and others have accepted the situation that their ability is low and therefore have no desire to attempt to show high ability. The latter two types are likely to choose situations where success is highly likely, that is a very easy task, and thus avoid showing low ability. In short, the effect of low perceived competence for high ego oriented individuals is complex and the present research design may lack sufficient discrimination to allow for this since we do not know the commitment of low perceived competence children toward demonstrating high ability. The predicted relationship with amotivation may have been attenuated as a result.

These arguments are similar to those put forward by Elliot and Harackiewicz (1996) and Skaalvik (1997), who propose that ego orientation be split into two types. Elliot and Harackiewicz refer to approach and avoidance ego goals, and Skaalvik to self-enhancing and self-defeating ego orientations. Across two experiments, Elliot and Harackiewicz found that intrinsic motivation was undermined only by ego goals that were avoidance-oriented, that is an ego goal aimed at avoiding unfavourable judgements of competence. An ego goal aimed at attaining favourable judgements of competence (approach-oriented ego goal) acted in the same way as a task-oriented goal. Similarly, Skaalvik, using the term self-defeating ego orientation to describe the avoidance-oriented approach, found this type of ego goal was negatively associated with intrinsic motivation in mathematics but self-enhancing ego orientation was positively associated. If this is the case, present results may be a function of not differentiating ego orientation in this way.

Although it was not the purpose of the present study to directly test goal perspectives theory, the results suggest that the influence of perceived competence appears more complex than sometimes acknowledged in similar research. It is recommended that the proposals of Elliot and Harackiewicz (1996) and Skaalvik (1997) be followed up.

Results also showed that more variance in amotivation was explained in the low perceived competence group than in the high PC group. This is to be expected since amotivation is much lower for those perceiving their competence to be high and is therefore a construct having less meaning or salience to them. Relationships will be attenuated in such a situation. Moreover, work on beliefs (Dweck & Leggett, 1988; Dweck et al., 1995; Kasimatis, Miller, & Marcussen, 1996; Mueller & Dweck, 1998) suggests that the strongest motivational effects will be in the face of adversity. This is more likely to be the case for those low in perceived competence. For example, low perceived competence individuals may focus on the possibility of failure and thus find ways to avoid it (Dweck, 1999).

In summary, the present study provides a viable measuring instrument and supports conceptually coherent relationships between beliefs and motivational variables. However, there is much to be done in terms of the study of motivated behaviour. First, the current study did not look into how individuals regulate their behaviour (motivation orientation) in an achievement setting. Since previous research has suggested that implicit theories, achievement goal theory, perceived competence, and self-determination theory are all associated with intrinsic motivation (see Chapter 2), it will be useful for further studies to examine their interrelationships concurrently. Second, the present study is cross-sectional and thus causality cannot be tested. More data need to be collected from prospective, longitudinal and experimental studies. Third, additional work is warranted on the role of beliefs for those experiencing success and failure. Dweck et al. (1995) have shown that the effects of such beliefs are particularly strong under conditions of adversity. This finding was partly supported in this study where amotivation was moderately predicted for those low rather than high in perceptions of competence. Taking this research further by investigating attributional and affective reactions to success and failure, in



conjunction with implicit beliefs, is recommended (Hong et al., 1999). This might help understand when, how and why different beliefs might be advantageous. For example, entity beliefs, while sometimes appearing motivationally maladaptive, might also provide 'order' to events and be a parsimonious way of organising one's view of the world (Dweck et al., 1995).

Whereas goal orientations research has shown that differentiating individuals on the basis of how they construe competence and define success is informative, the preliminary findings of this study, and the previous study, support the view that how people see the nature of athletic ability is also an important distinction to make in motivational research. Further work combining such beliefs with goals, and other constructs, is recommended in social psychological research. The next study, reported in Chapter 5, will examine the interrelationships between sport ability beliefs, achievement goals, perceived competence, motivational orientations, and amotivation. Instead of looking at individual differences, the next study will examine these relationships at the level of intraindividual differences to create a motivational profile of children in physical activity settings.

## CHAPTER V

### Study 3

# Young People's Motivational Profiles in Physical Activity: A Cluster Analysis

## 5.1 Introduction

The previous two studies focused on the development of the CNAAQ and its use in predicting intentions to be physically active and amotivated behaviour. Findings showed that conceptions of sport ability, goal orientations and perceived competence were important predictors of intention and amotivation. In the present study, self-determination theory (SDT, Deci & Ryan, 1985) will be included as an additional theoretical perspective to predict the motivational profiles of young people in physical activity. In particular, the main focus of the present study was to look at the interrelationships between conceptions of sport ability, achievement goals, perceived competence, behaviour regulation (motivational orientation), and amotivation within a person.

From the review of literature in Chapter 2, it is suggested that motivational variables centred on achievement orientation and perceptions of competence are worthy of study when considering young people's physical activity participation. Indeed, the sport and exercise psychology literature over the past decade or so has shown that such constructs are popular (Biddle, 1997) with numerous studies of achievement goal orientations (e.g., Duda et al., 1992; Fox et al., 1994) and associated belief structures (e.g., Biddle et al., 1999a; Lintunen et al., 1999), motivational climate (e.g., Ntoumanis & Biddle, 1999a; Treasure & Roberts, 1995), perceptions of competence (e.g., Weiss, Ebbeck, & Horn, 1997), and perceptions of autonomy, self-determination, and intrinsic motivational processes (e.g., Brunel, 1999; Chatzisarantis et al., 1997). However, while studies have often investigated motivational constructs in isolation and focused on individual differences between the isolated constructs, little is known about the intraindividual differences in patterns of key motivational

indicators when looking across a comprehensive profile of scores. The extent to which these motivational constructs are interrelated in one person, therefore, is not well understood and some have called for greater consideration of conceptual convergence (Biddle, 1999). The identification of subgroups of young people who represent different combinations or patterns based on these motivational determinants might prove instructive. In doing so, homogenous groups may be located and segmentation strategies developed to increase the effectiveness of interventions to promote physical activity in young people (Sallis & Owen, 1999).

In addition to conceptions of sport ability, goal perspectives theory, and perceived competence which have been the key constructs in Studies 1 and 2, this study also included self-determination theory constructs in order to gain a more comprehensive understanding of young people's motivation towards physical activity.

Self-determination theory (SDT) is an organismic theory of motivation that accounts for psychological needs and motives and provides an impressive wider theory of motivated behaviour (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b; see Chapter 2). The psychological needs include those of autonomy, competence and relatedness (social needs). People are motivated to satisfy these needs because they are considered essential for the development of the self. When autonomous, people experience choice and freedom in their actions, which is characterised by an absence of external pressures. On the other hand, when a person is compelled to do certain things, that is when the behaviour is not self-determined, the person is feeling 'controlled'. Building on Cognitive Evaluation Theory (Deci & Ryan, 1985), it has been shown that intrinsic motivation will increase under conditions of autonomous competence (Deci et al., 1999; Ryan & Deci, 2000b).

There are different types of behavioural regulations central to self-determination theory, each one reflecting a qualitatively different 'reason' for acting out the behaviour in question. In addition to intrinsic motivation, there are four types of extrinsic motivation. These are external, introjected, identified, and integrated forms of regulation. The latter is developmentally less appropriate for children and



adolescents and few studies of this age group have assessed integrated regulation (Vallerand & Fortier, 1998; see Chapter 2).

External regulation refers to behaviour that is controlled by external means, such as rewards or external authority. Introjected regulation refers to behaviour that is internally controlled or self-imposed, such as acting out of feelings of guilt avoidance, and is characterised by feelings of internalised pressure, such as 'I ought to ...'. For identified regulation the behaviour is self-determined according to one's choice or values. It is characterised by feelings of 'want' rather than 'ought'. Finally, intrinsically motivated behaviour is behaviour that is solely for its own sake or enjoyment. These four behavioural regulations can be assessed by using the Perceived Locus of Causality scale (PLOC) developed by Ryan and Connell (1989) or other scales (e.g., SMS, Brière et al., 1995; Fortier et al., 1995). The four regulations form a continuum that characterises the degree of internalisation of the behaviour (see Chapter 2). This is indicated by the Relative Autonomy Index (RAI) calculated by weighting each subscale. Positive scores indicate more autonomous regulation and negative scores indicate more controlling regulation. Research has shown the motivational benefits of more self-determined behavioural regulation in physical activity contexts with adults (Chatzisarantis & Biddle, 1998; Mullan & Markland, 1997) and young people (Biddle et al., 1999b; Chatzisarantis et al., 1997). Therefore, it is important to consider behavioural regulation in the study of motivational profiles of young people toward physical activity.

Through the profiles established in this study, individuals' profiles in terms of achievement goals and conceptions of sport ability can be examined further. Research adopting a goal perspectives approach has shown task and ego goal orientations to be orthogonal (Nicholls, 1989). Therefore, it is common practice for researchers to split goal profile groups into high task/high ego, high task/low ego, low task/high ego, and low task/low ego (e.g., Fox et al., 1994). A mean- or median-split is used to classify individuals into high or low groups. The typical mean score for task is usually over 4.00 and for ego around 2.80, both being assessed on 5-point scales (Duda & Whitehead, 1998, see Chapter 2). The problem with this way of imposing a structure on the data is that the extent to which these goal profiles actually exist in the

population is not known. Based on the cluster techniques employed in the present study, the existence of the four goal profile groups can be validated.

The relationship between incremental beliefs and entity beliefs has not been studied extensively (see Chapter 2). Although Dweck and Leggett (1988) proposed a bipolar relationship between the two implicit beliefs in the classroom domain, Sarrazin et al. (1996) argued that the two beliefs should be independent in the physical domain. There is a need to clarify this issue in the present study. In addition, the relationships between beliefs and goals will be examined.

## **5.2 Purposes of the Research**

The main assumption in this study is that there are variations in individuals in terms of achievement goal orientations, conceptions of the nature of sport ability, self-determination or perceived autonomy (RAI), amotivation, and perceived competence. Many investigations have studied such constructs in isolation, or merely compared one construct with another. It is argued that while each construct presents a distinct way of viewing motivation, a more complete picture will be obtained through the study of variables in combination. The purposes of this study, therefore, were three-fold. First, subgroups of young people with distinctive motivational profiles based on these important indicators of motivation will be sought. Following that, the variations in physical activity participation (PA) and perceived physical self-worth (PSW) in the different subgroups will be examined as a form of validation for any groups that emerged. It is assumed that individuals with higher motivational profiles should report higher physical activity participation and higher perceived physical self-worth. Second, age and gender differences in the subgroups will be examined. Third, individuals' goal and belief profiles, and the relationships between goals and beliefs, will be examined within each subgroup.

## 5.3 Method

### Participants

The study involved 2969 pupils (1566 girls and 1403 boys) from 49 schools in England. The sample was the same used in Study 2. The pupils were aged 11 to 15 years (mean = 12.93, SD = 0.89) attending classes in Years 7, 8 and 9. They were assumed to be representative of diverse socio-economic backgrounds across all geographical regions of England.

### Procedure and Measures

Pupils were randomly sampled within age and gender groups from schools recruited to take part in a larger project concerning curriculum change in physical education (same as Study 2). Normal informed consent and ethical procedures were followed and conformed to guidelines of the British Psychological Society. Questionnaires (Appendix 4) were administered by three trained research assistants in quiet classroom conditions in school time. General instructions were provided and help was offered in the case of difficulties. The following instruments were used:

*Achievement Goal Orientations.* Students' dispositional task and ego goal orientations were assessed with the established English (UK) version of the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Whitehead, 1998). The stem for the 13 items was 'I feel most successful in sport/PE when...'. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Sport Ability Beliefs.* The English version of the 'Conceptions of the Nature of Athletic Ability Questionnaire, Version 2' (CNAAQ-2) was employed to examine incremental and entity beliefs. Incremental beliefs were assessed through the two subscales reflecting 'Learning' (3 items, e.g., 'to be successful in sport you need to learn techniques and skills, and practise them regularly') and 'Improvement' (3 items, e.g., 'how good you are at sport will always improve if you work at it'). Entity beliefs were measured through two subscales reflecting 'Stable' (3 items, e.g., 'it is difficult



to change how good you are in sport') and 'Gift' (3 items, e.g., 'to be good in sport you need to be naturally gifted'). Responses were made on 5-point scales, similar to the TEOSQ. The supportive psychometric details have been fully reported in Studies 1 and 2.

*Relative Autonomy Index (RAI).* The Perceived Locus of Causality (PLOC) scale developed by Goudas et al. (1994a) by modifying the scale of Ryan and Connell (1989) was used to assess four types of behavioural regulation in the sport/PE context. The stem for all items was 'I take part in sport/PE ...'. External regulation (e.g., 'because I'll get into trouble if I don't') and introjection (e.g., 'because I'll feel bad about myself if I didn't') were assessed through four items each. Identification (e.g., 'because I want to improve in sport/PE') and intrinsic motivation (e.g., 'because sport/PE is fun') were measured through three items each. Responses were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An overall relative autonomy index (RAI) was calculated by weighting each subscale to indicate the level of autonomy in the following way: external regulation x (-2) + introjection x (-1) + identification x (1) + intrinsic motivation x (2). This serves as an indicator of a person's motivational orientation with positive scores indicating more autonomous regulation and negative scores more controlling regulation (Goudas et al., 1994a).

*Amotivation.* Amotivation was assessed by three items modified by Goudas et al. (1994a) from the Academic Motivation Scale (Vallerand et al., 1992; Vallerand et al., 1993). The stem for the items was 'I take part in sport/PE ...'. One example of the items was 'but I don't see why we should have sport/PE'. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Perceived Competence and Physical Self-Worth (PSW).* The Sport Competence and PSW items from the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989) were administered. These scales adopted a structured alternative format whereby participants chose one of two statements that best described them and then rated whether it was 'sort of true for me' or 'really true for me'. This produces a 4-point scale ranging from 1 to 4. Six items assessed perceived competence [e.g., 'some kids do very well at all kinds of sports' (positive pole)]. PSW reflects "general feelings of

happiness, satisfaction, pride, respect, and confidence in the physical self” (Fox, 1990, p. 6) and was assessed with six items [e.g., ‘some kids are proud of themselves physically’ (positive pole)].

*Physical Activity.* One item was used as a measure of the nature of sport/physical activity participation. The scale consisted of 1 (don’t play very much), 2 (recreational level), and 3 (competitive level). It was used, not to assess how much physical activity young people undertook, but to make distinctions between types of activity. Nevertheless, the distinction between levels 2 and 3 is likely to reflect a quantitative difference, because evidence shows that young people involved in competitive sport are more active than those playing more informally (Mason, 1995; Sallis, Prochaska, & Taylor, 2000)

### **Data Analysis**

To identify groups of pupils sharing similar responses on the motivational constructs, cluster analysis was conducted. The aim of cluster analysis is to identify homogenous groups or clusters based on the characteristics they possess. It is different from many of the more commonly applied multivariate statistical techniques, such as discriminant analysis, in that the researcher has no knowledge of the number and characteristics of the groups before applying cluster analysis (Hair, Anderson, Tatham, & Black, 1998). It has not been used a great deal in sport and exercise science research, although examples are available on physical activity and health behaviors (De Bourdeaudhuij & Van Oost, 1999) and sources of sport competence information (Weiss et al., 1997).

In hierarchical methods of cluster analysis, each observation starts out as its own cluster. Subsequently, new clusters are formed by the combination of the most similar clusters until either all clusters are grouped into one cluster or the researcher considers that a parsimonious solution has been achieved. Non-hierarchical methods (k-means) assign observations into clusters using nearest centroid sorting and requires the number of clusters to be specified (Anderberg, 1973). Since each method has some disadvantages, it is beneficial to combine the two (see Hair et al., 1998). The

number of clusters and the profile of the cluster centres can be established using the hierarchical methods. Following that, the non-hierarchical methods can be used with the cluster centres found in the hierarchical methods. In this way, the non-hierarchical methods can verify the results of the hierarchical methods (Hair et al., 1998).

Differences between clusters on the motivational variables were tested using MANOVA. In addition, the validity of the clusters was ascertained by testing for differences between the clusters on physical activity and PSW. In addition, differences by age (school year) and gender were tested.

## **5.4 Results**

### **Descriptive Statistics and Intercorrelations**

Table 5.1 shows the descriptive statistics for the whole sample. The participants were task oriented, incremental in their beliefs about sport ability, more likely to be identified and intrinsic in their motivation, and had moderate levels of perceived competence. The internal consistency of each subscale was also examined and Cronbach's alpha coefficients ranged from .65 to .86 (see Table 5.1). All values were satisfactory with the exception of introjection (PLOC) which was just below the typically accepted level of 0.70. Table 5.2 shows the intercorrelations between variables. As expected, moderate positive correlations were revealed between task orientation, incremental beliefs, and RAI.



**Table 5.1: Descriptive Statistics and Internal Reliability Coefficients for the Overall Sample**

Subscales	$\alpha$	Mean	SD
1. Task	.76	4.05	.51
2. Ego	.83	2.71	.84
3. Incremental	.75	4.17	.55
4. Entity	.70	2.38	.64
5. External Regulation	.80	2.25	.89
6. Introjection	.65	2.75	.77
7. Identification	.72	4.10	.71
8. Intrinsic Motivation	.82	4.17	.77
9. Perceived Competence	.80	2.75	.59
10. RAI	--	5.18	3.36
11. Amotivation	.70	1.85	.76
12. PSW	.86	2.79	.62
13. Physical Activity	--	2.35	.66

**Table 5.2: Correlation Matrix for All Variables**

	1	2	3	4	5	6	7	8
1.Task								
2. Ego	.14**							
3. Incremental	.41**	.07**						
4. Entity	-.12**	.12**	-.10**					
5. Perc. Comp	.33**	.21**	.26**	-.06**				
6. RAI	.47**	.03	.33**	-.30**	.50**			
7. Amotivation	-.38**	-.03	-.29**	.30**	-.41**	-.67**		
8. PSW	.29**	.14**	.21**	-.03	.72**	.41**	-.34**	
9. PA	.36**	.16**	.25**	-.07**	.56**	.42**	-.39**	.43**

Note: \*\*  $p < .01$ ; Perc. Comp = Perceived Competence; PA = Physical Activity.

A MANOVA was conducted with gender and year group as the independent variables and the seven clustering variables, including goal orientations (task and ego), sport ability beliefs (incremental and entity), Relative Autonomy Index (RAI), amotivation, and perceived sport competence as the dependent variables. Although the multivariate statistics showed significance interaction effects between gender and year groups, the effect size was very small ( $\eta^2 = .007$ ). Given such a large sample, this effect size indicates that the differences were negligible. Therefore, it was decided that gender and year group would not be included as clustering variables.

### Cluster Analysis

To identify the different motivational patterns in young people in sport and physical education, cluster analyses were conducted using the seven motivation variables used in the MANOVA. Hair et al. (1998) recommended a validation technique for cluster analysis which involved the use of at least one variable, called the external criterion, to validate the differences among profiles. To enhance power of the procedure, PSW and physical activity were chosen as the external criterion variables.

The stages of the cluster analysis decision process were guided by the procedures outlined by Hair et al. (1998). First, the cases with missing data on any of the seven variables were excluded. Second, all the variables were standardised using Z scores (mean of 0 and a standard deviation of 1). This is a standard procedure in cluster analysis. In this case, it was required because RAI and perceived competence utilised different scales compared to other variables. Standardisation prevents variables measured in larger units contributing more towards the distance measured than the variables utilising smaller units (Everitt, 1993). In the next step, the univariate distributions of all the clustering variables were inspected for normality. Cases with standard scores of greater than 3 were classified as outliers and were deleted from further analyses. The missing data and outliers deletion resulted in 459 cases being excluded from the original sample of 2969.

Ward's method was chosen to minimise the within-cluster differences and to avoid problems with forming long, snake-like chains found in other methods

(Aldenderfer & Blashfield, 1984). The agglomeration schedule and dendrogram were used to identify the number of clusters. The dendrogram suggested five-cluster and three-cluster solutions to be suitable. However, the agglomeration coefficient showed a larger increase from four clusters merging to three clusters (7.17%) compared to merging six clusters to five clusters (4.40%). Since a larger increase means dissimilar clusters are merged, it was decided that the five-cluster solution was more suitable. The F-test between the cluster centres in Table 5.3 supported that the five clusters were distinct.

Solutions from cluster analysis can be unstable and therefore additional analyses are advised to check the solution obtained. To confirm clusters, a k-means clustering method was used. First, the centroid values obtained from the hierarchical methods were used as the initial seed points for the k-means clustering. The final centroid values and the cluster size were compared to those obtained from the hierarchical methods. Table 5.4 shows that the profiles obtained from the k-means cluster analysis corresponded well with those obtained from the hierarchical cluster analysis, providing confidence for the 5-cluster solution.

The next stage of the analysis was to validate the stability of the cluster solution. A second k-means cluster analysis was performed with random initial seed points. The results confirmed a consistency of the five-cluster solution compared to the previous k-means cluster, in terms of both cluster sizes and profiles. Given the stability of the results between the specified seed points and random selection, the validity of the cluster analysis was supported.

To test the predictive validity of the cluster solution, a one-way MANOVA was conducted using physical activity participation and PSW as dependent variables and the five clusters as the independent variable. The results showed significant differences between the five clusters on the dependent measures [Wilks'  $\Lambda = .67$ ,  $F(8, 5008) = 138.66$ ,  $p < .001$ ,  $\eta^2 = .18$ ]. Table 5.5 contains the unstandardised and standardised (Z-score) means, standard deviations of the dependent variables for the five clusters. Follow-up ANOVAs for both physical activity participation [ $F(4, 2505)$



= 194.59,  $p < .001$ ,  $\eta^2 = .24$ ] and PSW [ $F(4, 2505) = 192.52$ ,  $p < .001$ ,  $\eta^2 = .24$ ] were significant. Post hoc tests using Tukey's HSD indicated that the differences in physical activity participation and PSW between any two clusters were significant ( $p < .001$ ). However, given that the physical activity measure may not be considered a true ordinal scale, an additional analysis was made of the frequency of young people in each of the three levels of physical activity involvement. The data confirmed the differences between clusters, as shown later. Thus, the predictive validity of the cluster solution was supported (see Profile of Cluster Groups).

### **Gender and Year Differences in Cluster Composition**

To further describe the clusters, a one-way MANOVA was conducted to test for gender and school year differences as dependent variables in cluster membership. The results indicated that there were significant differences among the clusters on the dependent measures [Wilks'  $\Lambda = .96$ ,  $F(8, 5008) = 14.39$ ,  $p < .001$ ,  $\eta^2 = .02$ ]. ANOVAs on year (years 7, 8, and 9) and gender were conducted as follow-up tests. The ANOVA for both year [ $F(4, 2505) = 3.04$ ,  $p = .016$ ,  $\eta^2 = .01$ ] and gender [ $F(4, 2505) = 26.09$ ,  $p = .000$ ,  $\eta^2 = .04$ ] were significant. Type I error was controlled using the Bonferroni procedure and each ANOVA was tested at the .025 level.

A closer examination of the multiple comparisons (Tukey's HSD) revealed that cluster 5 contained predominantly students from the higher year groups (Years 8 and 9). There were significant gender differences between all the cluster groups except between clusters 1 and 4 (equal number of male and female) and clusters 3 and 5 (mainly female students).

**Table 5.3: Significance Testing of Differences between Cluster Centres**

Variable	Cluster	df	Error	df	F Value	Significance
	Mean Square		Mean Square			
Task	231.35	4	.63	2505	365.97	.000
Ego	198.63	4	.69	2505	290.13	.000
Incremental	223.49	4	.64	2505	347.72	.000
Entity	214.10	4	.66	2505	324.38	.000
PC	236.79	4	.62	2505	380.92	.000
RAI	358.68	4	.43	2505	836.36	.000
Amotivation	334.06	4	.47	2505	713.68	.000

Note: PC = Perceived Competence; RAI = Relative Autonomy Index.

**Table 5.4: Cluster Means, Standard Deviations, and Z Scores for the Five-Cluster Solution of the K-Means Cluster Analysis**

Variable	Cluster 1 (N=828)			Cluster 2 (N=265)			Cluster 3 (N=421)			Cluster 4 (N=645)			Cluster 5 (N=351)		
	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z
1. Task	4.34	.36	.56	4.44	.38	.76	3.74	.41	-.61	4.01	.37	-.10	3.54	.58	-.99
2. Ego	2.55	.76	-.19	3.63	.70	1.09	1.95	.51	-.90	3.06	.66	.41	2.67	.80	-.05
3. Incremental	4.48	.41	.57	4.66	.34	.90	3.81	.45	-.65	4.01	.39	-.29	3.78	.61	-.71
4. Entity	1.99	.46	-.61	3.07	.64	1.08	2.16	.41	-.36	2.52	.50	.21	2.81	.66	.67
5. PC	2.99	.48	.40	3.31	.50	.94	2.44	.43	-.52	2.79	.44	.07	2.07	.50	-1.15
6. RAI	7.73	1.95	.76	6.51	2.46	.40	4.71	2.04	-.14	4.59	2.03	-.18	2.93	2.93	-1.59
7. Amotivation	1.34	.39	-.67	1.55	.59	-.40	1.80	.49	-.07	2.01	.56	.21	3.07	.69	1.59

Note: PC = Perceived Competence; RAI = Relative Autonomy Index.



**Table 5.5: Significance Testing of Cluster Differences in Physical Activity Level and Physical Self-Worth**

	Cluster 1 (N=828)		Cluster 2 (N=265)		Cluster 3 (N=421)		Cluster 4 (N=645)		Cluster 5 (N=351)		F Value	Signif.					
Variable	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z					
Physical activity	2.60	.55	.38	2.82	.42	.71	2.09	.61	-.39	2.33	.62	-.04	1.77	.62	-.88	194.59	.000
PSW	2.99	.55	.33	3.26	.56	.77	2.55	.52	-.38	2.79	.51	-.00	2.24	.58	-.89	192.52	.000

## Profiles of Cluster Groups

Figure 5.1 shows the graphical profiles for the five-cluster solution of the k-means cluster analysis. Z scores of  $\pm 0.5$  or greater were used as criteria to describe whether a group scored relatively 'high' or 'low' in comparison to their peers (Weiss et al., 1997). The first cluster contained 828 students (males = 425, females = 403). Tukey's honestly significant difference (HSD) tests indicated significant differences in all the variables between this cluster and all other clusters (at  $p < .005$ ), except for ego orientation ( $p < .05$  between Cluster 1 and 5). Specifically, this group of students had high task orientation ( $z = .56$ ), low entity beliefs ( $z = -.61$ ) and moderately high perceptions of competence ( $z = .40$ ). They also had the highest RAI ( $z = .76$ ) and significantly lowest amotivation ( $z = -.67$ ) compared to other clusters, as well as a positive Z score for incremental beliefs ( $z = .57$ ) and a negative score for ego orientation ( $z = -.19$ ). Active involvement in physical activity (63% played competitive sport and 34.1% recreational sport) and high PSW ( $z = .33$ ) were characteristics of these students. This cluster consisted of equal numbers from both genders equally distributed across the three year groups. Cluster 1 was labelled 'self-determined'.

Cluster 2 contained 265 students who had the highest task orientation ( $z = .76$ ), highest ego orientation ( $z = 1.09$ ), highest incremental beliefs ( $z = .90$ ), highest entity beliefs ( $z = 1.08$ ), highest perceived competence ( $z = .94$ ), and moderately high RAI ( $z = .40$ ) compared to other clusters and these differences were significant ( $p < .001$ ). It is noteworthy that this group of students had significantly higher physical activity levels and PSW ( $z = .77$ ) compared to students in the other four clusters ( $p < .001$ ). This cluster was made up of predominantly competitive sport participants (83.8%) with more males (66.8%) than females (33.2%), but equally distributed across the three year groups. Cluster 2 was labelled 'highly motivated'.

Cluster 3 (N = 421, 142 male, 279 female) consisted of students who were low in task orientation ( $z = -.61$ ), ego orientation ( $z = -.90$ ), incremental beliefs ( $z = -.65$ ) and perceived competence ( $z = -.36$ ). The differences were significant across the clusters (at  $p < .001$ ) and for incremental beliefs (at  $p < .05$ ) and there was no significant difference in RAI between cluster 3 ( $z = -.14$ ) and cluster 4 ( $z = -.18$ ) and

no significant difference between cluster 3 and cluster 5 in incremental beliefs ( $z = -.65$  &  $-.71$ , respectively). Physical activity participation (14.5% reported 'little or none'; 23.8% competitive involvement) and PSW ( $z = -.38$ ) were relatively low in this cluster compared to the Self-Determined and Highly Motivated clusters. The cluster consisted of 66.3% female and 33.7% male, with approximately equal number of students from the three school year groups. Cluster 3 was labelled 'lowly motivated'.

Cluster 4 ( $N = 645$ ) consisted of students who showed a relatively 'flat' profile, depicting scores within the  $+0.5$  to  $-0.5$  z-score range. Slight upward deviations were shown for ego orientation ( $z = .41$ ), entity beliefs ( $z = .21$ ), and amotivation ( $z = .21$ ). It should be noted that this group of students had significantly higher physical activity levels (51.5% recreational sport; 40.6% competitive sport) and PSW ( $z = -.00$ ) compared to students in the Lowly Motivated cluster ( $p < .001$ ). There were equal numbers of students in terms of gender (males = 313, females = 332) and year groups. Cluster 4 was labelled 'moderately motivated externals'.

The last cluster consisted of 351 students (121 male, 230 female) who had the lowest task orientation ( $z = -.99$ ), lowest perceived competence ( $z = -1.15$ ), lowest RAI ( $z = -1.59$ ), and highest amotivation ( $z = 1.59$ ), compared to other clusters ( $p < .001$ ). The group was characterised by low task orientation, low incremental beliefs, high entity beliefs, low perceived competence, low RAI, and very high amotivation. They also had the lowest physical activity (33.6% doing 'little or none'; 10.5% reporting competitive involvement) and PSW scores ( $z = -.89$ ) compared to other clusters ( $p < .001$ ). This group was predominantly female from the higher year group. Cluster 5 was labelled 'amotivated'.

### **Achievement Goal and Sport Ability Profiles**

The 'highly motivated' cluster showed a goal profile of high task/high ego. Only 10.5% of the total sample belonged to this profile group and was represented by more males than females. The 'self-determined' cluster had a high task/low ego profile. About 33% of the overall sample was classified under this cluster. Cluster 3,



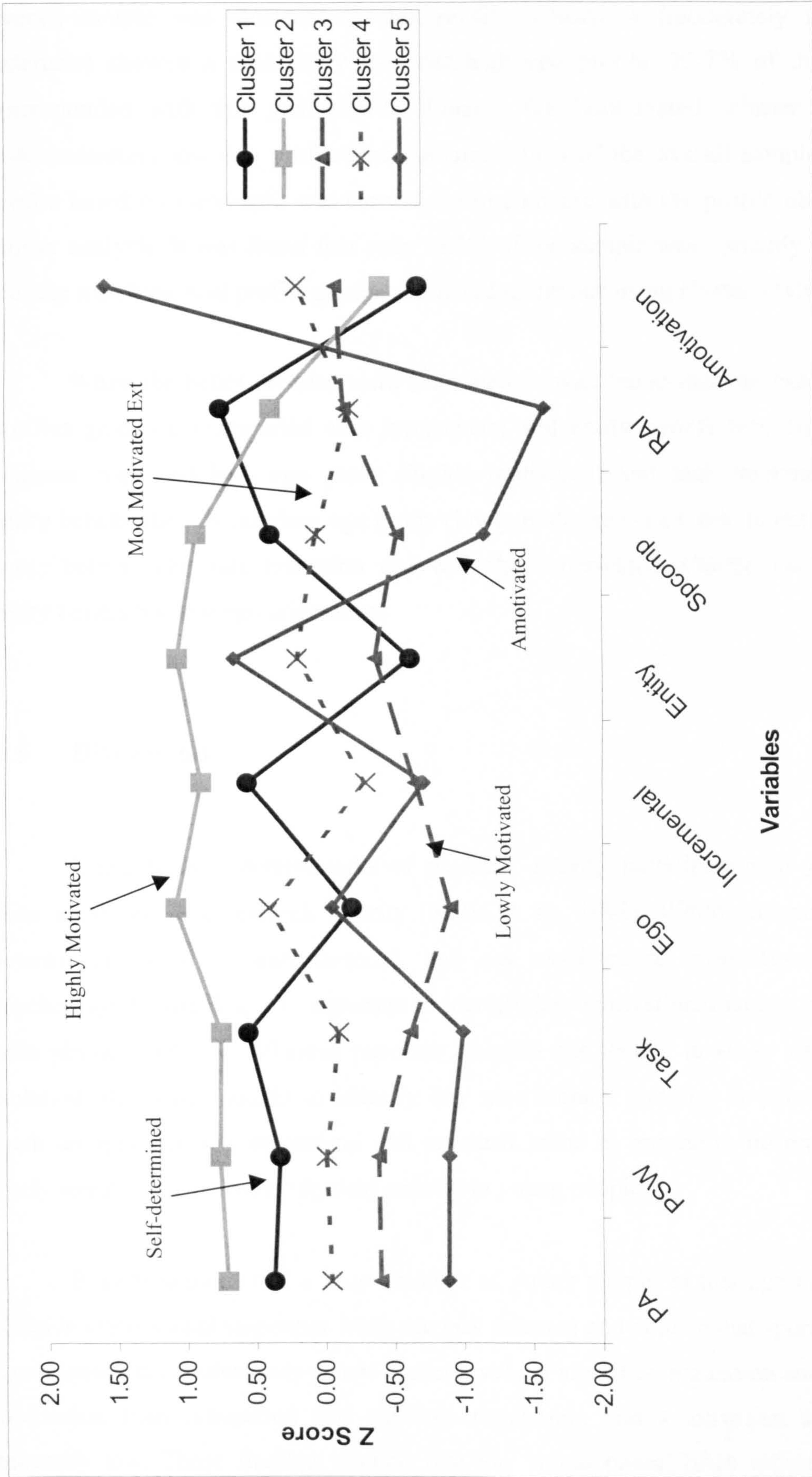


Figure 5.1. Cluster Profiles for the Five-Cluster Solution of the K-means Cluster Analysis.

or the 'lowly motivated' group, had a low task/low ego goal profile. 16.7% of the overall sample was clustered in this profile. Cluster 4 (moderately motivated externals) showed a moderately low task/high ego profile. 25.7% of the sample corresponded with this goal profile. Finally, the 'amotivated' cluster had low task/moderately low ego profile that contained 14% of the overall sample. A goal profile based on mean-split was carried out to compare with the profile obtained by cluster analysis. It was found that only 34.1% of the sample was correctly classified into the matching goal profile groups compared to the one using cluster analysis.

When the belief profiles were examined, it was found that the task and ego profiles groups corresponded with incremental and entity beliefs respectively. For instance, high task/high ego group (highly motivated) had high incremental/high entity beliefs, the low task/low ego group (lowly motivated) had low incremental/low entity beliefs. The only exception was with the 'amotivated' cluster that had high entity beliefs but low ego orientation.

## **5.5 Discussion**

Understanding determinants of physical activity participation in youth has been identified as a research priority (Sallis et al., 1992). While recognising that determinants will be multi-factorial, and not restricted to motivation or other psychological variables, it is important to identify key motivational factors associated with physical activity. Whereas previous research has tended to study variables in isolation, this study sought to identify key motivational patterns in young people. Such an approach has theoretical and practical value in providing information for likely strategies to promote physical activity in young people.

Results showed that a large number of young people in this age range have positive motivational responses. Most are task oriented and believe that sport ability is incremental. In addition, they report higher levels of identified regulation and intrinsic motivation than introjected and extrinsic regulation, and amotivation scores are generally low. These findings suggest that the 'moral panic' often reported in the



mass media concerning young people and physical activity seems exaggerated, at least from the point of view of self-reported motivational responses. Extrapolating further, one could conclude that many young people 'like' sport and physical activity. However, research has also shown that physical activity levels decline steeply in adolescence, particularly for girls (Van Wersch et al., 1992). In addition, with the levels of physical activity remaining too low for health benefits to accrue in the majority of adults, there is no room for complacency and there is a strong argument for continued study of this field. In addition, as the results show, there are groups of young people with distinct motivational profiles, with some less positive than others. The overall means, therefore, hide important differences between clusters.

In essence, results from the cluster analysis showed that motivation should not be characterised in simplistic terms, such as 'high' versus 'low'. For example, both the Self-Determined and Highly Motivated clusters were what one might call 'motivated' and 'positive' in their self-perceptions, as the validation data on physical activity and PSW confirmed. However, while both clusters reported very low rates of non-participation, they showed different *types* of involvement. The Self-Determined cluster showed higher numbers in recreational involvement whereas a very large percentage of the Highly Motivated cluster reported playing competitive sport, likely reflecting the high scores on task and ego orientation (Fox et al., 1994). The other main difference was shown by the Highly Motivated cluster being high in entity beliefs whereas the Self-Determined group showed lower scores on this variable. A self-determination theory approach might question whether more externally-referenced factors, such as ego and entity beliefs, have the same motivational stability as the profile depicted by the Self-Determined group. This requires further investigation.

Past research has pointed to the importance of different goal profiles in creating different motivational patterns (Fox et al., 1994). Few studies have used cluster analysis to identify intraindividual differences in achievement goal patterns. Although the results of the present study confirmed the presence of high task/high ego, high task/low ego, and low task/low ego groups in the population, the low task/high ego group might not be identified in a straightforward manner. Instead, a large proportion of the sample in this study was found to have a moderately low



task/high ego or low task/moderately low ego profiles. The results showed that the use of mean- or median-split methods might be problematic because the researchers imposed a structure on the data that ignored those with moderate goal profiles. Both procedures classified individuals as either high or low based on the scores of median or mean, which may be considered arbitrary. Cluster analysis, on the other hand, create more distinct groups that maximised between-group differences and minimised within-group differences (Hair et al., 1998). Therefore, caution is required for using the mean- or median-split technique in forming goal profile groups in future research.

The findings on the belief profiles provided some evidence that incremental beliefs and entity beliefs are independent. This is to say that people can be high or low in both beliefs, or high in one and low in another. In addition, the results showed that task orientation corresponded with incremental beliefs and ego orientation corresponded with entity beliefs. This provides support for the two previous studies in this thesis that incremental beliefs are linked to task orientation and entity beliefs are related to task orientation. However, there were individuals with high entity belief but low in ego orientation (amotivated cluster). These are probably those individuals who they felt that they are not 'cut out for sport' and therefore they are not interested to show their incompetence by adopting an ego orientation.

Consistent with previous research, it was found that the high task groups were positively related to adaptive motivational behaviors. The students in the high task clusters were more active in participation in physical activity, had high perceived competence and PSW, and perceived their participation to be self-determined (i.e., high RAI), and were not amotivated. Although high task orientation is conducive to motivated behaviour in the physical domain, high ego orientation may not necessarily be motivationally maladaptive. Groups that require immediate attention for intervention were those with low task and low ego orientations. These two clusters were the Lowly Motivated and the Amotivated groups. Both consisted of more girls than boys, the latter cluster also having students from the higher age group, confirming data from other studies on physical activity trends (Pratt, Macera, & Blanton, 1999). Interventions are needed to create feelings of self-referenced

competence, personal control and autonomy, such as the creation of an autonomy-supportive environment (Ryan & Deci, 2000a).

Students who were clustered into the Self-Determined or Highly Motivated groups had high incremental beliefs, high perceived competence and low amotivation. They were also higher in terms of physical activity participation and PSW, compared to the other clusters. On the other hand, the Amotivated group showed low task orientation, low incremental beliefs, high entity beliefs, low perceived competence, low physical activity participation, and low PSW. This cluster reflects low confidence to change and demonstrate success. For example, as a consequence of socialisation experiences, these young people have developed the belief that sport ability is relatively stable and is a product of giftedness, and this is reflected in feelings that they do not possess that ability, as they construe it. Interventions designed to reappraise the nature of success are indicated.

Previous research in physical education and physical activity has found that attraction towards physical activity tends to decrease with age in girls (e.g., De Bourdeauhuij & Van Oost, 1999). The findings of the present study are consistent with this. A greater number of older girls were represented in the clusters in which low perceived competence and high amotivation were the main characteristics. Moreover, boys were over-represented in the Highly Motivated group. The results suggest that older female students, with low perceived competence, low task orientation and low incremental beliefs, should be the main focus for interventions designed to increase physical activity. This is congruent with the study by Weiss et al. (1997) who found that motivationally 'at risk' children were those with low self-perceptions. The implications for physical educators, and other physical activity promotion specialists, centre on the need to promote autonomy, a mastery climate and to emphasise the importance of learning and incremental aspects in the acquisition of sport and other physical activity skills.

Limitations of the study should be recognised. First, the study is cross-sectional and would benefit from additional data collected at a later time to test the predictive validity of the clusters. Second, additional variables could have been included, such as those reflecting affective responses to physical activity. The study

investigated only a relatively restricted range of motivational factors. Third, the assessment of physical activity is rather crude, although the results of the validation procedure showed highly consistent and interpretable results in differentiating clusters on this variable.

In conclusion, this study has indicated that it is useful to identify groups of school students with different motivational patterns such that intervention programmes can be designed to target such groups more precisely. For example, identifying groups as 'high' or 'low' in motivation is likely to miss important information. In addition, the results suggest that targeting just one theoretical construct for intervention, such as goal orientations, may not be advisable. It may be more worthwhile to look at students' conceptions of sport ability beliefs, perceived competence, and behavioural regulations, together with goal orientations, to gain a deeper understanding of motivation. Given the multidimensional nature of motivation, studying such factors in combination may be fruitful.

The next study in this thesis will examine the causal relationships between conceptions of sport ability and achievement goals (Study 4). In addition, the cognitive, affective and behavioural outcomes of sport ability beliefs will be investigated.



## CHAPTER VI

### Study 4

## Effects of Experimentally-Induced Athletic Ability Beliefs on Goal Adoption, Cognition, Affect, and Behaviour

### 6.1 Introduction

The findings in Study 3 reinforced the fact that conceptions of sport ability have a significant impact on the motivational profiles of young people in physical activity. Although Studies 1 and 2, and previous research (Biddle et al., 1999a; Lintunen et al., 1999; Sarrazin et al., 1996), have provided some evidence that beliefs concerning sport ability may orient individuals toward adopting different goals in an achievement context, a causal link cannot be confirmed due to the cross-sectional nature of the studies. It was highlighted previously that experimental investigations are necessary to affirm the causal effects of beliefs on goals. This study was designed to assess the effects of experimentally-induced athletic ability beliefs in predicting goal orientations, as well as cognitive, affective and behavioural outcomes after failure feedback.

Referring to classroom research, Dweck (1999) has proposed that “an entity theory, with its idea of fixed intelligence, should make students concerned with showing they’re smart and so should foster performance (ego) goals” (p. 20). Conversely, Dweck says “an incremental theory, with its idea of malleable intelligence, should make students concerned with getting smarter and so should promote learning (task) goals” (p. 20; words in brackets added for clarity). These notions of ability beliefs require testing in sport and physical activity contexts.

In addition to linking the conceptions of sport ability to goals, motivational researchers also need to test whether children differing in entity and incremental beliefs show different cognitive, affective and behavioural responses. In the classroom

domain, Dweck (1999) predicts more negative outcomes for entity theorists in comparison to incremental theorists under conditions of failure. This is because those holding strong entity beliefs will doubt their (stable) ability after failure whereas those holding incremental beliefs will see failure as a temporary setback that is caused by a factor that can be rectified, such as an incorrect strategy. Consequently, more negative affective reactions after failure would be expected for entity theorists.

In addition, it would be expected that different attributions for failure would be made by people holding different conceptions of ability, with attributions to low ability more likely for those holding entity beliefs and attributions to low effort more likely for incremental theorists. Hong et al. (1999) provided some support in the classroom domain in that incremental theorists were more likely to attribute failures to effort compared to entity theorists. However, no differences were found between entity theorists and incremental theorists in making ability attributions in the face of setbacks. The authors argued that while entity theorists viewed ability as fixed, incremental theorists may viewed ability as indicative of their current levels on the task, and this differential conception of ability might have caused the two groups likely to both make ability attributions.

Finally, given the logic so far, behavioural differences would also be expected after failure feedback. For example, entity theorists, with their fixed conception of ability, are unlikely to take any remedial actions or to seek ways of improving their ability, such as signing up for training courses, and may prefer to take part in competition to demonstrate their ability. On the other hand, incremental theorists, with the conception that sport ability can improve, are more likely to sign up for training programmes to learn and improve on their skills and to reject competitions (Hong et al., 1999).

## **6.2 Purposes of the Research**

In summary, it seems that implicit theories are closely linked to achievement goals, as well as the exhibition of different cognitive, affective and behavioural responses. Evidence has mainly been gathered from the academic domain and the generalisability to the physical domain has yet to be tested. The first purpose of the present study, therefore, was to examine the causal relationships between conceptions of athletic ability and adoption of different achievement goals before and after encountering failure. The second objective was to investigate the differences in affective outcomes between incremental and entity theorists under conditions of adversity. Thirdly, the attributions made by entity and incremental theorists when faced with setbacks were examined. Finally, this study assessed whether entity and incremental theorists differed in their willingness to seek improvement in their ability. As no previous experimental studies in this field have been conducted in the physical domain, it was necessary for a pilot study to be conducted. The methodology and procedure were refined for the main study.

## **6.3 Pilot Study**

The main purposes of the pilot study were to assess the experimental procedure and to check the effects of the induction. The following two hypotheses were formulated for the pilot study:

1. An entity belief will lead to the adoption of performance (ego) goals and an incremental belief will lead to the adoption of learning (task) goals after experiencing failure.
2. After failure feedback, entity theorists will exhibit more negative affect and report less positive affect on the task compared to incremental theorists.



### 6.3.1 Method

#### Participants

The sample consisted of 53 secondary school students (25 males, 28 females) from one school in the Midlands of England. The students ranged in age of 11 to 14 years ( $M = 12.38$  years,  $SD = .65$ ). The school Headteacher gave informed consent for the participation of all the students. The experiment complied with ethical principles of the British Psychological Society. Participants were randomly assigned to receive either an entity belief manipulation ( $n = 15$ ), an incremental manipulation ( $n = 18$ ), or to a control group with no belief manipulation ( $n = 20$ ).

#### Procedure

The experimental sessions were conducted during the participants' normal physical education lesson whereby the teachers sent one student at a time to the experimenters to conduct the task. A quiet room near to the gym was used with the equipment set up, a table, and a chair. A golf putting task was chosen. The participants' aim was to putt a golf ball into a hole from different distances on a 3-metre (m) putting strip of artificial grass (an 'Astroturf' mat). Level 1 was 1m away from the hole, and Level 5, was 3m away from the hole. Each level was about half a metre apart. Before the manipulation of beliefs, each subject was given 10 familiarization trials to putt on a separate mat with no hole.

#### Manipulation of Beliefs

Before the manipulation, all the participants were told that the purpose of the task was to introduce golf putting to them. In the entity condition, the participants were asked to read a short passage that contained recent research findings on golf ability. The passage was as follows:

Research studies have shown that people are born with certain potential ability (or talent) required for certain sports and it is difficult to change that ability. The effect of training is to bring you to that potential faster. Take golf, for example, Tiger Woods was only 19 years old when he won the US Masters, because he had inborn talent. Golf putting, in particular, requires high abilities in terms of accuracy, coordination, and

spatial awareness in order to do well at high level. It is difficult to change those abilities even with training and practice. Some people are just better than others.

After the participants had read the passage they were invited to do a golf putting ability test to find out whether they were talented in golf.

In the incremental condition, participants was given the following passage to read:

Research studies have shown that people develop their sport abilities through learning and training. Therefore, in order to improve your abilities in sport, you need to train hard and practice regularly. Take golf, for example, one of the top golfers in UK, Nick Faldo, spends at least 20 hours per week training. Golf is a sport that requires training and practice, as long as you practice correctly, everyone can improve their golf abilities to a higher level.

After reading the passage, the participants were asked to do the golf putting ability test to find out their current level in golf. They were also told not to worry about making mistakes. In the control condition, there was no manipulation of beliefs. The participants were asked to do the golf putting test and to answer some questions honestly.

### Instructions and Feedback

After the belief manipulations, all participants completed the first questionnaire. In the actual trial, they were asked to putt 10 balls from Level 3 (2m away from hole), and to try to get as many balls in the hole as possible. No performance criterion was set. Participants in the entity group and incremental group were given feedback that they had performed poorly. No feedback was given to the participants in the control group. After receiving the feedback, participants were asked to indicate their preferred goal choice if they were allowed to do the test again, and were also asked to answer some questions by completing the second

questionnaire. Upon completion of the second questionnaire, the experimenter apologised to the participants that there was not enough time for them to continue and each participant was carefully debriefed.

### Measures

The first questionnaire (Appendix 5a) contained items measuring participants' conceptions of their golf ability and pre-task perceived competence. Due to time constraints and nature of the experiment, the administration of the full questionnaire was not possible. Therefore, items were selected from the respective subscales based on the highest factor loadings in confirmatory factor analyses from previous studies.

*Conceptions of Golf Ability.* Four items from the Conceptions of the Nature of Athletic Ability Questionnaire, version 2 (CNAAQ-2) were adapted to measure the participants' conceptions of their golf ability. There were 2 items measuring entity beliefs 'it is difficult to change how good you are in golf putting today in school' and 'to be good in the golf putting test you need to be naturally gifted', and two items measuring incremental beliefs 'to be successful in the golf putting test you need to learn techniques and skills and practice them regularly' and 'how good you are in the golf putting test will always improve if you work at it'. The four items were measured on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*Pre-Task Perceived Competence.* The item 'to what extent do you think that you are good at golf putting?' was used to measure perceived ability of the participants. A 7-point scale was used ranging from 1 (not at all) to 7 (very much so).

The second questionnaire (Appendix 5b) assessed goal choice, affective outcomes and post-task perceived competence.

*Goal Choice.* Two items from the task choice measures utilised by Dweck and Leggett (1988) were adopted to determine student's achievement goals. Performance goal was measured through the item 'I like to play in levels that are not too hard, so I don't get bad scores'. Learning goal (task goal) were assessed through the item, 'I like to try difficult and challenging levels so that I can try to learn from the task, even if I



won't do well.' A 7-point scale was used ranging from 1 (not true at all) to 7 (very much true).

*Affect.* The participants were asked to indicate the extent to which they felt tense, anxious, and happy in taking part in the golf putting test using a 7-point scale from 1 (not at all) and 7 (very much so).

*Post-Task Perceived Competence.* The participants were asked to what extent they think that they were good in the golf putting test on a 7-point scale from 1 (not at all) to 7 (very much so).

### 6.3.2 Results and Discussion

#### Manipulation Check

Two one-way ANOVAs were conducted with group as the independent variable and entity and incremental beliefs as dependent variables. The results revealed that the three groups differed in entity beliefs [ $F(2, 50) = 5.33, p = .008, \eta^2 = .18$ ] as well as incremental beliefs [ $F(2, 50) = 5.01, p = .010, \eta^2 = .17$ ]. Specifically, the entity group reported higher entity beliefs compared to the incremental ( $p = .02$ ) and control groups ( $p = .01$ ) and the incremental group scored higher in incremental beliefs compared to the entity group ( $p = .04$ ) and control group ( $p = .01$ ). The means and standard deviations of beliefs by groups are presented in Table 6.1. It can be seen that although the participants in the entity group scored significantly higher in entity beliefs compared to the other two groups, the score is considered low on a 5-point scale.

In summary, there is evidence that the manipulation of the entity beliefs might not be as effective as it should be, although significant differences were established between the groups. This might have an impact on the dependent measures, thus caution is required in interpreting the results.

## Dependent Measures

### **Goal Preference after failure**

Results of the ANOVAs indicated that there were no significant differences between groups in terms of goal preference after negative feedback [ $F(2, 50) = 1.43$ , *ns* for performance goals and  $F(2, 50) = .69$ , *ns* for learning goals]. The entity group did not appear to choose performance goals after negative feedback. All three groups were equally likely to select learning goals after receiving negative feedback (see Table 6.1). This is in contrast to Hypothesis 1.

**Table 6.1: Means and Standard Deviations of Manipulation Check Items and Dependent Variables by Group (Pilot Study)**

	Entity Group		Increm. Group		Control Group	
	Mean	SD	Mean	SD	Mean	SD
<b>Check Items</b>						
Entity Beliefs	2.77	1.21	1.94	.78	1.90	.53
Increm. Beliefs	3.60	.71	4.19	.49	3.55	.79
<b>Dependent</b>						
Perf. Goals	3.33	1.65	4.13	1.28	4.05	1.51
Learning Goals	4.47	1.92	4.94	1.70	5.15	1.60
Tension	3.47	1.51	3.22	1.26	3.05	1.67
Happy	3.87	1.30	3.67	1.57	4.60	1.64
Anxiety	3.93	1.49	4.22	1.63	3.90	1.74
Pre-task PC	2.67	1.35	2.72	1.60	3.00	.97
Post-task PC	3.47	1.41	3.22	1.56	3.30	1.13

Note: Increm. = Incremental; Perf. = Performance; PC = Perceived Competence.

### **Affective Measures**

The results of the ANOVAs showed that the three groups did not differ in affective outcomes [ $F(2, 50) = .33$ , *ns* for tension,  $F(2, 50) = 1.97$ , *ns* for happiness,  $F(2, 50) = .21$ , *ns* for anxiety]. The control group showed the lowest levels of tension and anxiety and the highest level of happiness compared to the other two

groups. This indicated that the negative feedback might induce some negative affect in the participants in the two experimental groups. However, the effect was too small to be detected. Therefore, Hypothesis 2 was not supported.

### **Perceived Competence**

There were no differences between the three groups on either pre-task or post-task perceived competence. However, a one-way repeated measures ANOVA revealed that there were significant changes in perceived competence from pre- to post-task [ $F(1, 50) = 6.46, p = .01$ ]. All participants increased their perceived competence after the task.

### **6.3.3 Conclusion**

First, although the manipulation appeared moderately successful, the results suggested that the induction of entity beliefs did not create clearly distinct groups with regard to these beliefs. One reason could be due to the persuasive method used for the induction. The participants were asked to read the passage that highlighted each belief, with the hope that participants would be led to adopt a particular mode of thought. However, due to the young age of the participants (majority aged between 11 to 13 years), they might not have comprehended the passage well. This suggests that the induction methods need refinement. Instead of asking participants to read the passage, it would be better if the experimenter in the main study reads the passage to them. In addition, all the three groups were found to endorse incremental beliefs. This is not surprising because incremental items are more appealing and socially desirable (Hong et al., 1999).

Second, it appeared that despite the negative feedback given, participants in the incremental group and entity group were equally likely to choose learning goals and the entity group did not appear to choose performance goals as predicted. This could be due to the failure of the manipulation or it could be possible that the level that the participants were told to putt (Level 3) was perceived as relatively easy and provided no challenge to them. Therefore, they would like more challenging levels even though they were given failure feedback. This was supported by the increase in post-task perceived competence. In addition, no criterion was given for the



performance. The participants, who were mostly golf novices, might have set their own standard of evaluation.

## **6.4 Main Study**

After the pilot study, revisions were made to the manipulation procedure, instructions, and additional manipulation check items were included. Specifically, the passages were read by the experimenter and each participant was asked whether he/she understood the message. In the main study, the control group was given negative feedback along with the two experimental groups in order to hold feedback constant. In addition, a performance criterion was set for the golf putting task to enable the participants to evaluate their performance objectively. Additional manipulation check items were used and more performance goal choice items were added to offset the possibility of social desirability. Finally, the questionnaire was revised to test all the hypotheses stated for the main study.

Specifically, the following hypotheses were formulated for the main study:

1. An entity belief will lead to the adoption of performance (ego) goals and an incremental belief will lead to the adoption of learning (task) goals, both before and after experiencing failure.
2. After failure feedback, entity theorists will exhibit more negative affect and report less enjoyment on the task compared to incremental theorists.
3. Entity theorists will attribute failure to ability rather than effort when compared to incremental theorists. Conversely, incremental theorists will attribute failure more to effort and less to ability.
4. Entity theorists will be less likely to take the opportunity of participating in a training programme and more likely to take part in competition compared to incremental theorists.

In terms of gender differences, no specific hypotheses have been formulated since no previous studies have examined sport beliefs between males and females students. However, gender differences will be examined in the main analyses and results will be reported.

## **6.5 Method**

### **Participants**

The sample comprised 123 secondary school students (54 males, 69 females) from a different school in the English Midlands. The students ranged in age from 11 to 15 years (mean = 13.40 years, SD = 1.18). Because the experiment took place in normal school time, it was considered appropriate that the school Headteacher give informed consent for the participation. The experiment complied with ethical principles of the British Psychological Society.

### **Procedure**

The basic procedure was similar to the pilot study. The participants were sent to the experimental sessions one at a time during their normal physical education lesson. The golf putting task remained as the target activity.

### **Manipulation of Beliefs**

Equal numbers of participants were randomly assigned to receive either an entity belief manipulation, an incremental manipulation, or to a control group with no belief manipulation.

In the entity group, the participants were told that the purpose of the task was to take part in a “Talent Identification Scheme” for a well-known university that aimed to identify young talent in golf. In addition, the participants were told that:

Research studies have shown that people are born with certain potential ability (or talent) required for certain sports and it is difficult to change

that ability. Skills can be improved through learning and training but ability cannot change. Take golf, for example - Tiger Woods was only 19 years old when he won the US Masters. Clearly he is naturally gifted. Golf putting, in particular, requires high abilities in terms of accuracy, coordination, and spatial awareness in order to do well at a high level. It is difficult to change those abilities even with training and practice. Some people are just better than others.

After these instructions, the participants were invited to take part in a golf putting ability test to find out whether they were talented in golf.

In the incremental group, participants were told that the purpose of the session was to introduce golf putting to them. In addition, they were told:

Research studies have shown that people develop their sport abilities through learning and training. Therefore, sport ability can be improved through proper training and practice. There is no such thing as born talent or genius in sport. Take golf, for example - one of the top golfers in UK, Nick Faldo, spends at least 20 hours per week training. Golf is a sport that requires training and practice; as long as you practice correctly, everyone can improve their golf abilities to a higher level.

After the manipulation, the participants were asked to take part in the golf putting ability test to find out their current level in golf. They were also told not to worry about making mistakes.

This method of belief manipulation has been used in previous studies (Bergen, 1991; Hong et al., 1999; Kasimatis et al., 1996) and has been shown to be successful in leading the participants to engage in a particular belief mode.

In the control group, there was no manipulation of beliefs. The participants were asked to do the golf putting test and to answer some questions honestly.



### **Instructions and Feedback**

After the manipulations, the participants completed the first questionnaire. In the experimental trials, the participants were asked to putt the ball from Level 4 (second most difficult position). They were told that the criterion was to putt 4 out of 10 balls into the hole. The norm was set artificially high in anticipation that no participant would surpass it. Using this procedure, three people were eliminated because they scored 4 or higher.

After the trials, the participants in all three groups were given failure feedback. They were told that they did very badly in the trials. Participants were then asked to indicate their preferred task choice if they were allowed to do the task again and to answer some questions by completing a second questionnaire. Upon completion of this questionnaire, the experimenter apologised to the participants that there was not enough time for them to continue and each participant was carefully debriefed.

### **Measures**

Due to time constraints and the nature of the experiment, the administration of the full questionnaire was not possible. Therefore, items were selected from the respective subscales based on the highest factor loadings in confirmatory factor analyses from previous studies. The first questionnaire (Appendix 6a) contained items measuring participants' conceptions of their golf ability, ability certainty, goal preference before the task, and perceived competence. All items were measured on 6-point scales with 1 indicating strongly disagree or not at all to 6 indicating strongly agree or very much so.

*Conceptions of Golf Ability.* Four items from the Conceptions of the Nature of Athletic Ability Questionnaire, version 2 (CNAAQ-2) were adapted to measure the participants' conceptions of their golf ability. There were two items measuring entity beliefs 'it is difficult to change how good you are in golf putting today in school' and 'to be good in the golf putting test you need to be naturally gifted', and two items measuring incremental beliefs 'to be successful in the golf putting test you need to

learn techniques and skills and practice them regularly' and 'how good you are in the golf putting test will always improve if you work at it'.

*Ability Certainty.* Two items were used to assess how certain the participants were that their golf putting ability could improve or was a natural gift. The item 'to what extent are you certain that golf putting ability can improve?' measures improvement certainty, and the item 'to what extent are you certain that golf putting ability is a natural gift?' measures gift certainty. These two items were used as additional manipulation checks to the conceptions of sport ability measures.

*Preference Goals before Failure.* Two items were used to assess participants' intended goals before doing the task. The stem was 'I intend to do the golf putting test today in school ...'. One item measured an ego goal ('to do better than others in golf putting') and one item measured a task goal ('to learn from the golf putting test').

*Pre-Task Perceived Competence.* The perceived ability of the participants in golf putting was measured through two items: 'I expect myself to do well in the golf putting test today' and 'I expect myself to be among one of the best in the golf putting test today'.

The second questionnaire (Appendix 6b) assessed goal choice, affect, attributions, and behavioural choice. Similar to the first questionnaire, all items were measured on a 6-point scale ranging from 1 (strongly disagree or not at all) to 6 (strongly agree or very much so).

*Goal Choice.* All the four items of the task choice measures from Dweck and Leggett (1988) were adopted to assess student's achievement goals. Dweck and Leggett (1988) suggested that different goals were embodied in the choice of tasks. There were three items measuring a performance (ego) goal: 'I like to play levels that are not too hard, so I don't get bad scores' (item 1), 'I like levels that are hard enough to show that I am good in golf' (item 2), and 'I like levels that are fairly easy, so I will do well' (item 3). The fourth item measured a learning goal (task goal): 'I like to try difficult and challenging levels so that I can try to learn from the task, even if I won't

do well' (item 4). The purpose of using 3 items to measure an ego goal was to offset the social desirability of the task goal (Dweck, 1999; Dweck & Leggett, 1988). Exploratory factor analysis with varimax rotation suggested that items 2 (loading .74) and 4 (.88) loaded on the same factor (learning goals) and item 1 (.89) and item 3 (.87) loaded on a second factor (performance goals). The total variance explained was 75.34%. Therefore, only items 1 and 3 were taken as measures of performance goals and item 4 represented learning goals. Item 2 was dropped from further analyses.

*Affect and Enjoyment.* Four items were used to measure the affective outcomes of the participants after receiving failure feedback. The participants were asked to indicate the extent to which they felt tense, anxious, and happy in taking part in the golf putting test and also how much they enjoyed their participation. The scale used for enjoyment was an 11-point scale from -5 (unenjoyable) to 5 (enjoyable).

*Attributions.* The participants' attributions for their performance were measured through four items with the stem, 'I did well/didn't do well in the golf putting test today in school because ...'. The participants were asked to indicate the degree they agreed that their performance was due to effort and ability.

*Behaviour Choice.* This measure was used to indicate the behavioural choice of the participants. They were asked to indicate whether they were keen to take part in a golf putting competition and to join a course teaching golf putting in school.

## 6.6 Results

### Manipulation Check

The means and standard deviations of the participants' ability beliefs and ability certainty by groups are presented in Table 6.2 and the gender differences are presented in Table 6.3. A 2 x 3 (gender x group) MANOVA was conducted with beliefs as dependent variables to check whether manipulation was successful. The results revealed significant differences between groups [Wilks'  $\Lambda = .621$ ,  $F(4, 226) =$



15.17,  $p = .000$ ,  $\eta^2 = .21$ ]. Follow-up tests showed that significant differences existed in both incremental [ $F(2, 114) = 4.75$ ,  $p = .010$ ,  $\eta^2 = .08$ ] and entity beliefs [ $F(2, 114) = 30.92$ ,  $p = .000$ ,  $\eta^2 = .35$ ] but with no interaction effect nor a gender main effect between the two beliefs. Post-hoc tests, using Tukey's HSD tests, found that the Incremental group had higher incremental beliefs compared to the Entity group ( $p = .001$ ) and the Entity group had higher entity beliefs compared to the Incremental group ( $p = .000$ ) and Control group ( $p = .000$ ).

**Table 6.2: Means and Standard Deviations of Manipulation Check Items by Group**

	Entity Group		Increm. Group		Control Group	
	Mean	SD	Mean	SD	Mean	SD
Entity Beliefs	3.54	.71	2.04	1.11	2.46	.62
Increm. Beliefs	4.58	1.04	5.24	.63	4.94	.74
Gift Certainty	3.60	1.19	2.35	1.08	2.53	1.01
Improve Certainty	4.60	1.06	5.03	.92	5.10	.87
Pre-Task PC	3.80	1.20	3.50	1.01	3.71	1.02

Note: Increm. = Incremental; PC = Perceived Competence.

The two certainty items were used as additional checks for the manipulation of beliefs. The results of a 2 x 3 (gender x group) MANOVA indicated main effects for groups and gender, but no interaction effects [for groups: Wilks'  $\Lambda = .764$ ,  $F(4, 226) = 8.15$ ,  $p = .000$ ,  $\eta^2 = .13$ ; for gender: Wilks'  $\Lambda = .895$ ,  $F(2, 113) = 6.61$ ,  $p = .002$ ,  $\eta^2 = .11$ ]. ANOVAs revealed significant difference between the three groups in gift certainty [ $F(2, 114) = 15.95$ ,  $p = .000$ ,  $\eta^2 = .22$ ]. A post-hoc test, using Tukey's HSD, showed that the entity group was more certain that their ability was a gift than the incremental group ( $p = .000$ ) and the control group ( $p = .000$ ). In addition, males scored higher in improvement certainty than females, [ $F(1, 114) = 10.12$ ,  $p = .002$ ,  $\eta^2 = .08$ ] (see Table 6.3).

**Table 6.3: Means and Standard Deviations (in Parentheses) of the Manipulation Check Items by Group and Gender**

	Entity Group		Increm. Group		Control Group	
	Males	Females	Males	Females	Males	Females
Entity Beliefs	3.50 (.81)	3.56 (.67)	2.12 (1.18)	1.95 (1.04)	2.53 (.65)	2.41 (.62)
Increm. Beliefs	4.96 (.84)	4.37 (1.08)	5.48 (.58)	4.97 (.59)	4.76 (.75)	5.06 (.73)
Gift Certainty	3.93 (1.21)	3.42 (1.17)	2.38 (.86)	2.32 (1.29)	2.76 (1.15)	2.35 (.88)
Improve Certainty	5.14 (.77)	4.31 (1.09)	5.09 (.89)	4.95 (.97)	5.47 (.72)	4.83 (.89)
Pre-Task PC	4.39 (1.11)	3.48 (1.14)	3.83 (.94)	3.13 (.98)	4.00 (.95)	3.50 (1.04)

Note: Increm. = Incremental; PC = Perceived Competence.

A 2 x 3 (gender x group) ANOVA on pre-task perceived competence indicated that no difference between the three groups was found [ $F(2, 114) = 1.86, p = .16$ ] (see Table 6.2). This indicates that participants' pre-task perceived competence had no effect on the dependent measures. However, the results revealed significant gender differences [ $F(1, 114) = 13.32, p = .000, \eta^2 = .11$ ] (see Table 6.3). Specifically, males had higher perceived competence in golf compared to females.

In sum, the results of the manipulation checks showed that the induction of the conceptions of sport ability was successful. In addition, the effects of beliefs on dependent variables were not due to perceptions of competence. As noted in the pilot study, there is a tendency for the participants to endorse incremental beliefs, possibly due to social desirability.

## Dependent Measures

### Goal Preference before failure (Beating others vs. Learning)

A 2 x 3 (gender x group) MANOVA was performed with participants' goal preference before encountering failure as dependent variables. The results revealed that there was no significant main effect for groups [Wilks'  $\Lambda = .924$ ,  $F(4, 226) = 2.27$ ,  $p = .062$ ,  $\eta^2 = .04$ ], although a trend was apparent. ANOVAs indicated that the three groups differed in performance goals [ $F(2, 114) = 4.38$ ,  $p = .015$ ,  $\eta^2 = .07$ ] and post-hoc tests using Tukey's HSD showed that the Entity group was more likely to have the intention to beat others compared to the Incremental group ( $p = .045$ ). All three groups showed high intention to learn before failure (see Table 6.4). Significant gender differences were found [Wilks'  $\Lambda = .906$ ,  $F(2, 113) = 5.89$ ,  $p = .004$ ,  $\eta^2 = .09$ ]. Male participants were more likely to want to learn from the task than females [ $F(1, 114) = 10.03$ ,  $p = .002$ ,  $\eta^2 = .08$ ] (see Table 6.5). No interaction effect was found.

### Goal Choice after Failure (Performance vs. Learning)

After experiencing failure feedback, there was a significant main effect for group [Wilks'  $\Lambda = .817$ ,  $F(4, 226) = 6.01$ ,  $p = .000$ ,  $\eta^2 = .10$ ], but no gender main effect or interaction effect. ANOVAs revealed that the groups differed in the adoption of learning [ $F(2, 114) = 3.23$ ,  $p = .043$ ,  $\eta^2 = .05$ ] and performance goals [ $F(2, 114) = 10.41$ ,  $p = .000$ ,  $\eta^2 = .15$ ]. Post-hoc Tukey's HSD tests indicated that the Incremental group was more likely to adopt learning goals than the Entity group ( $p = .028$ ) while, in contrast, the Entity group was more likely to adopt performance goals than the Incremental group ( $p = .000$ ) and the Control group ( $p = .009$ ) (see Table 6.4).

In summary, the results suggest that fixed conceptions of sport ability are more likely to orient the participants to performance (ego) goals and incremental conceptions of sport ability lead to the adoption of learning (task) goals. This supports Hypothesis 1. In addition, the causal link between beliefs and goal adoption seems more plausible when the participants are faced with challenge. Moreover, there were no gender differences in the adoption of goals in the three groups when faced with setbacks, although male participants were more likely to adopt learning goals than female participants before they received failure feedback.



**Table 6.4: Means and Standard Deviations of Goal Preferences at Different Phases by Group**

	Entity Group		Incremental Group		Control Group	
	Mean	SD	Mean	SD	Mean	SD
Beat Others (Before)	3.25	1.46	2.48	1.52	2.60	1.34
Learning (Before)	4.70	1.24	4.60	1.37	4.70	1.16
Learning Goals (After)	3.83	1.30	4.55	1.24	3.90	1.22
Performance Goals (After)	4.74	.91	3.51	1.29	4.00	1.09

**Table 6.5: Means and Standard Deviations (in Parentheses) of Goal Preferences at Different Phases by Group and Gender**

	Entity Group		Incremental Group		Control Group	
	Males	Females	Males	Females	Males	Females
Beat Others (Before)	3.86 (1.61)	2.92 (1.29)	2.43 (1.66)	2.53 (1.39)	2.82 (1.33)	2.43 (1.34)
Learning (Before)	5.21 (.70)	4.42 (1.39)	4.81 (1.25)	4.37 (1.50)	5.24 (.66)	4.30 (1.29)
Learning Goals (After)	4.21 (1.19)	3.62 (1.33)	4.57 (1.12)	4.53 (1.39)	4.24 (1.25)	3.65 (1.15)
Performance Goals (After)	4.39 (.86)	4.92 (.89)	3.52 (1.13)	3.50 (1.47)	3.74 (1.05)	4.20 (1.09)

### Affective Measures

The results of the 2 x 3 (gender x group) MANOVA indicated that there was no main effect for groups nor a significant interaction between gender and group in terms of affective measures (tension, anxiety, happiness, and enjoyment) (see Table 6.6). A significant main effect was found for gender [Wilks'  $\Lambda = .821$ ,  $F(4, 109) = 5.95$ ,  $p = .000$ ,  $\eta^2 = .18$ ] with males more anxious than females ( $p = .048$ ), but also reporting higher enjoyment in taking part in the test ( $p = .000$ ) (see Table 6.7). The findings do not support Hypothesis 2. This could be explained by the fact that all

groups reported only moderate levels of anxiety and tension, but moderately high positive affect (see Table 6.6).

### Attributions after Failure

A 2 x 3 (gender x group) MANOVA was conducted with ability and effort attributions as dependent variables. As predicted, there was a significant main effect for group [Wilks'  $\Lambda = .921$ ,  $F(4, 226) = 2.37$ ,  $p = .05$ ,  $\eta^2 = .04$ ]. Follow-up ANOVAs revealed that the three groups differed on ability [ $F(2, 114) = 4.80$ ,  $p = .010$ ,  $\eta^2 = .08$ ] but not effort attributions. Post-hoc tests showed that Entity theorists made significantly stronger ability attributions than Incremental theorists ( $p = .038$ ) and the Control group ( $p = .015$ ) (see Table 6.6). There was no main effect for gender nor an interaction effect. Hypothesis 3 was therefore supported for ability attributions only.

**Table 6.6: Means and Standard Deviations of Attributions, Affective and Behavioural Measures After Failures by Group**

	Entity Group		Incremental Group		Control Group	
	Mean	SD	Mean	SD	Mean	SD
Happiness	3.62	1.46	3.55	1.40	3.31	1.26
Tension	3.33	1.58	2.80	1.38	3.23	1.18
Anxiety	3.31	1.47	3.23	1.46	3.05	1.34
Enjoyment	2.46	2.19	2.75	1.92	2.82	1.60
Ability	4.23	1.29	3.54	1.24	3.44	1.16
Effort	3.00	1.24	2.78	1.33	2.73	1.09
Competition	3.60	1.61	3.68	1.56	3.40	1.75
Training	3.88	1.59	3.73	1.57	3.45	1.50
Programme						

**Table 6.7: Means and Standard Deviations (in Parentheses) of Attributions, Affective and Behavioural Measures After Failures by Group and Gender**

	Entity		Incremental		Control	
	Males	Females	Males	Females	Males	Females
Happiness	3.64 (1.65)	3.60 (1.38)	3.52 (1.40)	3.58 (1.43)	3.75 (1.34)	3.00 (1.13)
Tension	3.29 (1.59)	3.36 (1.60)	2.48 (1.36)	3.16 (1.34)	3.00 (1.17)	3.39 (1.16)
Anxiety	4.21 (1.37)	2.80 (1.29)	3.29 (1.52)	3.16 (1.42)	3.06 (1.61)	3.04 (1.15)
Enjoyment	3.54 (1.42)	1.86 (2.33)	3.10 (1.13)	2.37 (2.07)	3.75 (1.00)	2.17 (1.63)
Ability	4.29 (1.25)	4.19 (1.33)	3.40 (1.04)	3.68 (1.44)	3.24 (1.16)	3.59 (1.15)
Effort	2.64 (1.08)	3.19 (1.30)	2.52 (1.33)	3.05 (1.31)	2.88 (1.36)	2.61 (.84)
Competition	4.07 (1.64)	3.35 (1.57)	4.05 (1.47)	3.26 (1.59)	4.65 (1.27)	2.48 (1.47)
Training Programme	4.43 (1.16)	3.58 (1.72)	4.43 (1.25)	2.95 (1.54)	4.47 (1.01)	2.70 (1.36)

### Behavioural Choice

There were no significant differences between the three groups wanting to participate in a training programme or take part in a competition in the future (see Table 6.6). Neither was there any significant interaction between group and gender. However, a main effect for gender was found [Wilks'  $\Lambda = .800$ ,  $F(2, 113) = 14.09$ ,  $p = .00$ ,  $\eta^2 = .20$ ] with male participants more keen to take part in golf putting competition [ $F(1, 114) = 19.06$ ,  $p = .000$ ,  $\eta^2 = .14$ ] and to sign up for a training programme [ $F(1, 114) = 27.61$ ,  $p = .000$ ,  $\eta^2 = .20$ ] (see Table 6.8). Hypothesis 4 is therefore rejected.



## 6.7 Discussion

The purposes of the present study were to examine the impact of conceptions of sport ability on achievement goals, and on cognitive, affective and behavioural responses. The results showed that sport ability beliefs can be experimentally manipulated. Support was found for a causal link between conceptions of sport ability and goals (Hypothesis (H) 1). In addition, ability attributions for failure were stronger for entity theorists (H3). However, hypotheses predicting differences on effort attributions (H3), affective reactions (H2), and behavioural markers (H4) were not supported.

This study extended the work of Dweck and her colleagues (Dweck & Leggett, 1988; Elliot & Dweck, 1988; Hong et al., 1999) into the physical domain. As no experimental work has been conducted in physical activity settings, the use of manipulation checks was deemed necessary to be confident in the experimental induction. Results indicated that the induction was indeed successful. However, with the higher means for incremental beliefs over entity beliefs, one could argue that all three groups endorsed incremental beliefs. Two possible reasons for the participants' tendency for adopting incremental beliefs are put forward. First reason is due to the accessibility of the constructs (Higgins, King & Mavin, 1982). It can be argued that because the participants are in an educational context where learning and improvement are constantly reinforced, the construct of incrementality is highly accessible to them and thus they reported high incremental beliefs. The second reason could be due to the social desirability of incremental beliefs. The measure of implicit beliefs used in previous studies (Chiu, Hong & Dweck, 1997; Chiu, Dweck, Tong, & Fu, 1997; Hong et al., 1999) was typically a 3-item questionnaire designed by Dweck and Henderson (1988) to measure entity beliefs only. Participants scoring 4 or higher on a 6-point scale were classified as entity theorists while those scoring 3 or lower were classified as incremental theorists. Reliability and validity for the measurement items have been satisfactory (see Hong et al., 1999). The present study included items

depicting incremental beliefs, which may have caused the participants to report high incremental beliefs because of social desirability.

Hypothesis 1 predicted that an entity belief in sport ability will lead to the adoption of performance (ego) goals and an incremental belief in sport ability will lead to the adoption of learning (task) goals, either before or after experiencing failure. The results showed an interesting contrast in the goal adoption of the different groups before and after experiencing failure. Before setbacks, all participants showed high intentions of learning from the activity regardless of entity and incremental beliefs. However, after they failed to demonstrate their competence in the task, participants with higher entity beliefs were more likely to choose easy and performance goals, while those with higher incremental beliefs persisted with challenging and learning goals. This is in line with previous studies (Dweck & Leggett, 1988; Hong et al., 1999) which have established that implicit theories are more evident when individuals are faced with setbacks and view failure as a threat to self-esteem. Holding entity beliefs alongside an unsuccessful performance may lead individuals to withdraw effort, give up learning opportunities or experience learned helplessness (Rhodewalt, 1994).

Parallel with previous research conducted in the academic domain using implicit theories of intelligence (Dweck & Leggett, 1988), this study showed that lay conceptions of sport ability are important for goal adoption in the physical domain. That is, an entity belief leads to the adoption of performance goals and an incremental belief leads to the adoption of learning goals. The implication for practitioners, such as physical educators, coaches, and exercise promoters, is that since sport beliefs are antecedents of goals, an additional strategy for intervention is to cultivate incremental beliefs in pupils, athletes, and exercisers, particularly in the early learning stages, in order to create more adaptive motivational behaviour.

According to previous research, entity theorists will be more likely to exhibit negative affect, and to report less enjoyment on the task, compared to incremental theorists (Dweck & Leggett, 1988). However, this study did not find evidence for this hypothesis (H2). One reason may be that the experimental context created may not

have been sufficiently powerful to influence affective responses in the expected directions. A second possible reason could be the participants enjoyed the golf putting experience despite the failure feedback (enjoyment,  $M = 2.68$  on a  $-5$  to  $+5$  scale) and therefore they downplayed their negative affect when responding to the questionnaire. Future studies need to consider other ways of measuring the dependent variables, such as facial expressions or behavioural manifestations, instead of relying solely on self-report measures.

Hong et al. (1999) indicated that when faced with challenge, entity theorists were less likely to attribute failure to effort compared to incremental theorists but no differences in ability attributions emerged between the two groups. In contrast, this study found that both entity and incremental theorists did not attribute their failure to effort (lower than 3.00 on a 6-point scale). However, the entity theorists were more likely to make ability attributions than the incremental theorists. Thus H3 was only partially supported. In terms of effort attributions, the incremental theorists may have viewed effort as irrelevant in contributing to their poor performance because they were not given much time to practise the golf putting test. On the other hand, as it was made explicitly clear to them in the beginning that the task was a test of ability, the incremental theorists may have been led to focus on demonstrating their current ability. In both cases, the element of effort becomes less salient. The finding that entity theorists were more likely to make ability attributions is consistent with Dweck and Leggett's (1988) proposal that implicit theories set up goals and goals then set up subsequent attributions.

Regardless of their conceptions of sport ability, participants in this study were equally likely to register for training courses and take part in competition. This is inconsistent with Hypothesis 4 and previous research in the academic domain (Hong et al., 1999). Perhaps this is a unique feature of the physical activity domain. Participating in competition for the incremental theorists may be a way to improve their current ability, whereas for the entity theorists, competition may be viewed as a way of proving their superiority. In terms of taking up training courses, entity theorists may see themselves as talented golfers but require further knowledge in the sport. The incremental theorists may see the training course as a chance for personal



development even though they may perceive themselves to be weak in golf. The different meanings embedded in their behavioural choice need further investigations.

In terms of gender differences, the results showed that there were no gender differences in the adoption of implicit theories. Male participants were more certain that they can improve, and had higher intention to learn and higher perceived competence before encountering failure than females. Therefore, subsequently, they reported higher enjoyment and indicated that they were keen to participate in the training course and competition, compared to the female participants. These findings were not surprising as can be explained partially by gender-related socialisation experiences (Duda, 1989).

In summary, this study supported the causal relationships between implicit theories and the adoption of achievement goals and demonstrated that goals, in turn, set up different ability attributions. However, no negative affective outcomes when faced with setbacks were found in the entity theorists, and incremental beliefs did not predict the likelihood of making effort attributions. Taken as a whole, the meaning system approach of implicit theories, attributions and behavioural choice in the face of failure proposed by Hong et al. (1999) may not be as straight forward when applied to the physical domain. Further investigations are required to clarify the links between implicit theories and effort attributions and the likelihood of remedial action in the face of failure.

Having established the causal link between conceptions of sport ability and adoption of achievement goals, the next study examines the causal relationships between achievement goals and intrinsic motivation.

## CHAPTER VII

### Study 5

## Effects of Experimentally-Induced Goal Involvement on Intrinsic Motivation

### 7.1 Introduction

One of the central concerns of researchers and educators is to promote intrinsic goals and interest in order to foster long-term motivation and achievement among students. In recent years, goal perspectives theory has been accepted as a theoretical framework in guiding motivational research in education. The previous studies in this thesis have also mainly adopted this perspective. In study 4, the causal relationships between the conceptions of sport ability and the adoption of achievement goals were confirmed. That is, it was found that an entity belief leads to the adoption of performance or ego goals and an incremental belief leads to the adoption of learning or task goals. The next step is to examine the causal relationships between goals and cognitive processes, affective responses, and behavioural outcomes. Specifically, the aim of the present study is to explore the conceptual links between goal perspectives theory and self-determination theory.

In Chapter 2, it was reviewed that a great deal of research in academic and sport domains has been conducted to determine the correlates of goal orientations and other related motivational constructs. Generally, task orientation has been found to have a positive relationship with more adaptive patterns of behaviour (e.g., challenge seeking, effort exertion, use of effective learning strategies; Duda, 1996), cognition (e.g., beliefs concerning the primacy of effort; Duda, 1996), and affect (Ntoumanis & Biddle, 1999a) than ego orientation. For example, positive relationships have been found between task orientation and intrinsic motivation (Dorobantu & Biddle, 1997; Duda et al., 1995), intrinsic interest and positive affect (Duda et al., 1995; Hom et al., 1993), and enjoyment (Vlachopoulos & Biddle, 1997).

Enjoyment and intrinsic motivation are important mediators of the effects of goals on performance. The distinction between enjoyment and intrinsic motivation is explained later (see Section 7.2). Ryan and Deci (2000a) suggest that intrinsic motivation and enjoyment enhance high-quality learning and creativity. Therefore, it is important to examine the conceptual link between goals and intrinsic motivation. According to the theories, task orientation enhances intrinsic motivation because the focus is on task mastery, promoting challenges and supporting autonomy (Deci & Ryan, 1985; Dweck & Leggett, 1988). In contrast, ego orientation produces internal and external pressures to perform well, thereby increasing anxiety, and diminishing intrinsic motivation (Dweck, 1986; Nicholls, 1989; Ryan, 1982). However, research using goal perspectives theory has mainly been cross-sectional and correlational in nature, and thus a causal link between goals and motivation or behaviour cannot be affirmed. In Rawsthorne and Elliot's (1999) meta-analytic review of the relationships between achievement goals and intrinsic motivation, only 23 experimental studies from 1971 to 1997 met inclusion criteria for the meta-analysis. That is, these studies contained a situation-specific experimental manipulation of achievement goals with intrinsic motivation as the outcome variable. In general, these experimental studies yield mixed results of the hypothesised relationships. For example, an undermining effect of performance goals on intrinsic motivation was found in Ryan et al.'s (1991) study, but the findings of Koestner et al. (1989) did not support such a hypothesis. It should be noted that most of these experimental studies have not employed manipulation checks on the goal induction. Given the orthogonal relationship of these two goals, individuals may focus on both performance and learning goals, or high in one and low in another, or may not necessarily have a dominant goal in a particular achievement situation (Fox et al., 1994). There is a need, therefore, for further studies to look into the specific influences of task and ego involvement on intrinsic motivation. The purpose of the first experiment in this paper was to examine the effects of experimentally-induced goal involvement on enjoyment and intrinsic motivation.



## **Self-Determination Theory and Intrinsic Motivation**

The constructs of intrinsic motivation and enjoyment are central to self-determination theory (SDT; Deci & Ryan, 1985, 1987). It is proposed that three key psychological needs, namely, needs for competence, autonomy and relatedness (social needs), are related to intrinsic motivation (see Chapter 2). In other words, one is intrinsically motivated when the three psychological needs are satisfied.

Within SDT, Deci and Ryan have also proposed Cognitive Evaluation Theory (CET; Deci & Ryan, 1985). This contains four propositions to describe the effects of an event on intrinsic motivation. In general, CET proposes that events that lead to need satisfaction will enhance intrinsic motivation, while events that thwart need satisfaction will undermine intrinsic motivation (see Chapter 2). The main purpose of CET was to integrate studies that examined the effects of different types of rewards, interpersonal contexts, feedback, and cue values on intrinsic motivation. Several studies have provided strong support for the proposed theory. CET also posits that any event such as rewards, or goal, can have two functional aspects, autonomy supportive or controlling. When people perceived contexts are controlling their behaviour, they attached a controlling functional significance to the event. On the other hand, when social context is perceived as supporting their autonomy, an autonomous functional significance is attached to the stimulus. How a stimulus is perceived depends on how the environment communicates that stimulus (Deci & Ryan, 1987). According to CET, intrapersonal events or states, such as ego involvement, may be perceived as having an autonomous functional significance. However, no studies have yet to provide any support for this. In fact, most studies showed that ego involvement had a controlling functional significance which undermined intrinsic motivation, whereas task involvement had an autonomous functional significance as it enhanced autonomous self-regulation (Plant & Ryan, 1985; Ryan, 1982; Ryan et al., 1991).

Research conducted in interpersonal contexts has shown that those who communicate to others in an autonomy-supportive way, as opposed to controlling way, create greater intrinsic motivation, higher self-esteem, creativity, and the desire to seek challenging tasks (Deci et al., 1981a, 1981b; Ryan & Grolnick, 1986). One experiment conducted by Deci et al. (1994) found that social contexts that supported

self-determination through providing a meaningful rationale, acknowledgement of the participants' feelings, and provision of choice would facilitate internalisation. If the three facilitating contextual factors were not provided, introjection (taking in a value but not identifying with it) is likely to occur. It is argued that teachers' autonomy-motivating styles can facilitate students' motivational orientation of being an active agent, or "origin" rather than being passive or a "pawn" in deCharms's (1976) terms. For example, if the teacher provides choice, acknowledgement of conflicts, and a rationale that is personally meaningful to the students for a particular task, it is likely to nurture self-determination or facilitate the process of internalisation (shift from external to internal locus of causality) of the students. This, in turn, has a significant impact on students' intrinsic motivation for the task. Therefore, the quality of students' motivation in an achievement context does not depend solely on their goal involvement, but the communication styles of the teacher have a significant role to play as well.

Research reviewed so far suggests that task involvement leads to more motivationally adaptive behaviour, and an autonomy interpersonal style leads to the enhancement of intrinsic motivation. However, no studies have yet examined the effects on intrinsic motivation and enjoyment when goal involvement is paired with communication style. In particular, what will be the effects on intrinsic motivation and enjoyment when task involvement is communicated in a controlling way and what will happen when ego involvement is communicated in an autonomous manner? The answers to these questions could have a significant impact on the delivery style and content of educators, coaches, parents, and others who wish to promote optimal motivation for long-term achievement among students, and therefore needs further investigation. This study reports two experiments on the effects of different goal involvement states and interpersonal communication style on enjoyment and intrinsic motivation during and after a sport task under positive feedback conditions. Experiment 1 addresses goal involvement whereas Experiment 2 is an investigation of communication styles alongside goals.

## 7.2 Experiment 1: Manipulation of Goal Involvement

According to goal perspectives theory, individuals high in task involvement, and ego-involved individuals with high perceived competence, will not differ in their levels of reported enjoyment and intrinsic motivation (Duda, 1993; Dweck & Leggett, 1988; Heyman & Dweck, 1992; Nicholls, 1989). On the other hand, Ryan et al. (1991) found that ego-involved participants (who were told that a puzzle task was a test of creative intelligence) reported significantly less intrinsic motivation than the task-involved participants (who were told to focus on the task) under positive feedback. It was argued that the focus of the ego-involved participants was to prove their competence, hence, after receiving positive feedback, they had no motivation to continue the task during the free-choice practice period. To resolve the inconsistency of previous research, the present experiment was designed to further examine the effects of experimentally-induced goal involvement on enjoyment and intrinsic motivation under positive feedback conditions.

Enjoyment is usually assessed using self-report measures whereas one way to assess intrinsic motivation is through the use of a behavioural free-choice paradigm. In an experimental design, the participants are usually informed that the session is over and they are not required to do the target activity anymore. The researchers then leave them alone with a few alternative activities available for a few minutes and observe them unobtrusively. The time spent on the target activity during this free-choice period is taken as a measure of intrinsic motivation. There is a distinction between self-reported enjoyment and the behavioural measure of intrinsic motivation. For example, participants can report high enjoyment because they receive positive feedback, but this does not necessarily mean they enjoyed the activity per se. Free-choice behaviour is a better measure of intrinsic motivation because it reflects doing the activity out of interest when one feels free to do so (Deci & Ryan, 1985). It is also a behavioural rather than a self-report measure, and this is often seen as desirable in psychological research. However, Ryan et al. (1991) highlighted that free-choice behaviour can also be internally controlling rather than truly intrinsically motivated (see Chapter 2). The former is doing the task due to internal pressure to achieve a



certain outcome, while the latter is doing the task for genuine interest or for enjoyment.

In order to assess intrinsic motivation accurately, Ryan et al. (1991) proposed that both measures of intrinsic motivation should be used. When the correlation between free-choice behaviour and self-reported enjoyment is high, it implies that the behaviour is intrinsically motivated. A low correlation indicates that the behaviour is more internally controlled. Ryan et al. (1991) found that ego-involved participants, whether in the presence of external control (surveillance) or internal control (ego-involvement), tended to display more internally controlling motivation ( $r = .45$ ) compared to the task-involved participants ( $r = .70$ ). Very few studies have used both measures and reported the correlations (Deci et al., 1999).

To examine the effects of achievement goals on intrinsic motivation, the following hypotheses, according to the findings of Ryan et al. (1991), were formulated:

Under positive feedback,

1. participants in the ego-involved group will display less enjoyment and free-choice behaviour than those in the task-involved group, and
2. ego-involved individuals will display less intrinsically motivated free-choice persistence compared to those who are task-involved.

## 7.2.1 Method

### Participants

The participants were 127 secondary school students (63 boys, 64 girls) from two comprehensive schools in the English Midlands. The students ranged in age from 11 to 16 years ( $M = 13.43$ ;  $SD = 1.40$ ). Because the experiment involved normal school curriculum time, it was considered appropriate for the school Headteacher to give informed consent for participation. The experiment complied with ethical principles of the British Psychological Society.

## Procedure

The study was conducted in two sessions. Students' dispositional goal orientations and general perceived physical competence were measured in the first session, and an experimental session was conducted two weeks later during normal PE lessons. In the experimental session, participants were randomly assigned to receive either a task involvement induction, an ego involvement induction, or no goal induction (control group). Equal numbers of males and females were assigned to each condition. Ten individuals did not complete the pre-task questionnaire and were excluded from further analyses (see Table 7.1 for sample sizes in each condition).

A golf putting task was chosen as the performance task. The participants were given 10 practice trials followed by 10 assessment trials. The aim of the task was to putt the golf balls into the hole from a line 1m away on an artificial grass mat with a single putt.

Participants were tested individually by two experimenters in a quiet room containing the golf putting equipment, a table, a chair, and some topical magazines on the table (see Free-Choice Period).

## Goal Involvement Induction

One-third of the participants received a task-involved induction whereby they were told that the aim for them was to learn and master the techniques of golf putting. They were also told not to worry about making mistakes or how others performed, and that there would be an assessment of their learning at the end of the session. Another one-third of the participants received an ego-involved induction. This induction described that the aim of the task was to outperform other students in the school in golf putting. The participants were told that they would be considered one of the best in golf putting in the school if they scored more than 2 out of 10 in the assessment trials. The level was set at 2 to ensure most participants would exceed. Those scoring less than 2 were eliminated from further analyses ( $n = 7$ ).

The participants in the two conditions were reassured of their competence through positive feedback during the assessment trials. The remaining one-third of the participants was assigned to a control group, with no induction or feedback.

### Free-Choice Period

After the assessment trials, each participant was told that that was the end of the session. The experimenter said that he needed a few minutes to fetch another participant from the class. Participants were told that while they waited they were free to do whatever they wanted, including reading magazines or practicing golf putting. Each participant was left alone in the room for four minutes. During this free-choice period, a second experimenter, unaware of the participant's experimental condition, observed the participant through the small glass panel on the door and recorded the amount of time the participant spent putting. This is reported as free-choice behaviour in the results section. Caution was taken not to allow the experimenter to be seen by the participant. After the free-choice period, the first experimenter returned to the room and requested that the participant complete a questionnaire. All participants were carefully debriefed.

### Closing Procedure

After completion of the final questionnaire, but before returning to his/her PE class, each participant was told not to inform anyone about the experiment. As a check, the participants were invited to take part in a game to guess the correct number of mini golf balls in a jar. They would win a prize for the correct answer. The actual number of mini golf balls was such that a correct guess would be highly unlikely. Each participant was informed of the correct answer as (s)he left the room. It was assumed, therefore, that if anyone correctly guessed the number, he or she must have prior information concerning the experiment. Based on this procedure, five participants were eliminated from the experiment.

### Measures

Two weeks before the experiment, the participants' dispositional goal orientations were measured using the 12-item Perception of Success Questionnaire (POSQ; Roberts et al., 1998). Satisfactory Cronbach's alpha coefficients were



reported for task (.86) and ego (.87) subscales. The six items from the Sport Competence subscale of the Physical Self-Perception Profile (PSPP-PC; Fox & Corbin, 1989) were used to measure perceived sport competence, and the internal consistency of this sub-scale was satisfactory (.78). Responses were given on 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree) for both POSQ and PSPP-PC (Appendix 7).

After the experimental manipulations, but before taking part in the task, participants completed the first questionnaire (Appendix 8a). This contained items designed to measure goal involvement and pre-task perceived competence.

*Goal Involvement.* Four items from the POSQ were adapted to assess the goal involvement of the participants. The stem of each question was 'I will feel most successful in the golf putting task today in school if ...'. Task involvement included statements: 'I show clear personal improvement' and 'I master something I couldn't do before'. Ego involvement was also assessed through two statements: 'I beat other people' and 'I am the best'. A 5-point scale was used anchored by strongly disagree (1) and strongly agree (5). These items were selected from the respective subscales based on the highest factor loading in the confirmatory factor analysis from the pre-measures.

*Pre-Task Perceived Competence.* To measure the participants' pre-task perceived competence, two items were used: 'I expect myself to be good in the golf putting task today in school' and 'I expect myself to be among the best in the golf putting task today in school'. A 5-point scale was used ranging from strongly disagree (1) to strongly agree (5).

The second questionnaire (Appendix 8b), administered after the assessment trials, contained two items. One measured enjoyment experienced in the putting task (task enjoyment) on an 11-point scale from -5 (unenjoyable) to +5 (enjoyable). The second item assessed post-task perceived competence. Specifically, participants were asked 'To what extent do you think you were good at the golf putting task today in

school?' Responses were made on a 7-point scale ranging from not at all (1) to very much so (7).

The final questionnaire contained one item to assess the participants' free-choice enjoyment similar to the item used in the second questionnaire (see Appendix 8c).

## 7.2.2 Results and Discussion

### Preliminary Analyses

Means and standard deviations of the dispositional goal orientations of the three groups are presented in Table 7.1. In general, the participants are in line with previous research (Duda & Whitehead, 1998) by having a high dispositional task orientation, and moderate levels (i.e., near the scale mid-point) of dispositional ego orientation and general perceived physical competence. To examine any differences between the three groups in the pre-task measures, a one-way MANOVA was conducted with dispositional goal orientations and general perceived competence as the dependent variables and groups as the independent variable. Multivariate tests revealed that there were significant differences between the three groups [Wilks'  $\Lambda = .85$ ,  $F(6, 200) = 2.82$ ,  $p = .012$ ,  $\eta^2 = .08$ ]. Follow-up ANOVAs indicated that there were no significant differences in dispositional ego orientation ( $p = .09$ ) and general perceived physical competence ( $p = .15$ ). However, there was a significant differences for task orientation [ $F(2, 102) = 7.58$ ,  $p = .001$ ,  $\eta^2 = .13$ ] with the task-involved group having lower dispositional task orientation compared to the control group ( $p = .001$ ) using the Tukey's HSD. This discrepancy between the two groups could be due to sampling error. Due to the small sample sizes in each group, gender and age effects were not examined.

It is possible that the participants' dispositional goal orientations and general perceived physical competence may have influenced their goal involvement, intrinsic motivation and enjoyment, therefore, the dispositional goal orientations and general perceived physical competence were used as covariates in subsequent analyses.

Before conducting each MANCOVA in the main analyses, tests of homogeneity-of-slopes assumption were carried out. The purpose of these tests was to check any significant interaction between the covariates and the factor, suggesting that the differences in groups on the dependent variables vary as a function of the covariation. If the interaction is significant, the results of the MANCOVA will not be meaningful since the assumption is not met (Green, Salkind, & Akey, 1997). The results showed no significant interaction between the covariates and the factors.

**Table 7.1: Means and Standard Deviations (in Parentheses) for Pre-Measures by Condition (Experiment 1).**

	Condition		
	Task-Involved N = 33	Ego-Involved N = 32	Control N = 40
Task Orientation	3.87 ( .65)	4.07 ( .68)	4.41 ( .48)
Ego Orientation	2.50 ( .63)	2.86 ( .99)	2.90 ( .77)
General PC	2.97 ( .72)	3.06 ( .71)	3.28 ( .66)

Note: PC = Perceived Competence.

### Manipulation Check

To check whether the manipulations of goal involvement were successful, a one-way MANCOVA was conducted with the two goal involvement measures as dependent variables and group as the independent variable, with dispositional goal orientations and general perceived physical competence as covariates. It was revealed that there were significant differences between the three groups [Wilks'  $\Lambda = .814$ ,  $F(4, 194) = 5.25$ ,  $p = .000$ ,  $\eta^2 = .10$ ] in their goal involvement. Univariate F-tests showed that there were significant differences between the groups both in their ego involvement [ $F(2, 98) = 8.53$ ,  $p = .000$ ,  $\eta^2 = .15$ ] and in their task involvement [ $F(2, 98) = 3.38$ ,  $p = .04$ ,  $\eta^2 = .06$ ]. The results of the post-hoc tests showed that the ego involvement of the ego-involved group was significantly higher than the task-involved group [ $F(1, 98) = 6.77$ ,  $p = .011$ ] and the control group [ $F(1, 98) = 16.58$ ,  $p = .000$ ]. The task-involved group reported higher task involvement than the control



group [ $F(1, 98) = 5.45, p = .02$ ] and the ego-involved group also had higher task involvement than the control group [ $F(1, 98) = 4.54, p = .036$ ]. In addition, the correlations between task involvement and ego involvement were computed as an additional check. It was found that in the control group, the correlation between the two goal involvement scores was moderately positive ( $r = .39$ ), whereas in the experimental groups, task and ego involvement scores were largely independent ( $r = .06$  for the task-involved group, and  $r = .10$  for the ego-involved group). This shows that the induction of the experimental conditions was successful.

In general, the participants in the ego-involved group increased their ego involvement compared to the control group, indicating that the manipulation was successful. However, their task involvement also increased. This may have been due to the increased utilisation of a task involvement focus as a strategy to secure win-oriented goals. This is supported by prior research that has shown some children to be high in both task and ego orientation (Fox et al., 1994). The participants in the task-involved group and control group were predominantly highly task involved and lowly ego involved (see Table 7.2) giving little room for changes in task involvement.

**Table 7.2: Means and Standard Deviations (in Parentheses) for Manipulation Check Items by Condition (Experiment 1).**

	Condition		
	Task-Involved N = 33	Ego-Involved N = 32	Control N = 40
Task Involvement	4.39 ( .56)	4.39 ( .62)	4.06 ( .74)
Ego Involvement	2.36 (1.29)	3.42 (1.29)	2.28 (1.32)
Pre-task PC	2.70 ( .91)	2.84 ( .88)	3.04 ( .79)
Post-task PC	5.09 (1.03)	4.84 (1.19)	4.28 (1.28)

Note: PC = Perceived Competence.

As a check for the feedback manipulation, a one-way MANOVA was conducted on pre-task perceived competence and post-task perceived competence between the three groups. Significant differences between the three groups were found [Wilks'  $\Lambda = .841$ ,  $F(4, 194) = 4.39$ ,  $p = .002$ ,  $\eta^2 = .08$ ]. Follow-up ANOVAs showed that the three groups did not differ in pre-task competence. However, after the positive feedback, there were significant differences between the three groups in terms of post-task perceived competence [ $F(2, 98) = 5.90$ ,  $p = .004$ ,  $\eta^2 = .11$ ]. Specifically, the participants in the control group reported significantly lower post-task perceived competence compared to the task-involved [ $F(1, 98) = 11.34$ ,  $p = .001$ ] and ego-involved groups [ $F(1, 98) = 4.89$ ,  $p = .029$ ]. These findings suggest that the feedback manipulation was successful. The means and standard deviations are presented in Table 7.2.

### Enjoyment and Free-Choice Behaviour

To test hypothesis (H) 1, a one-way MANCOVA was conducted with the three groups representing three levels of the independent variable, and task enjoyment and free-choice behaviour as dependent variables. The results indicated that there were significant differences between the three groups [Wilks'  $\Lambda = .789$ ,  $F(4, 192) = 6.03$ ,  $p = .000$ ,  $\eta^2 = .11$ ]. Tests of between-subjects analyses revealed that the ANCOVA on task enjoyment was significant [ $F(2, 97) = 12.63$ ,  $p = .000$ ,  $\eta^2 = .21$ ], while the ANCOVA on free-choice behaviour was not significant [ $F(2, 97) = 1.00$ ,  $p = .370$ ,  $\eta^2 = .02$ ]. Post-hoc tests were conducted to evaluate pairwise differences among the three groups on each of the dependent variables. It was found that the task-involved participants [ $F(1, 97) = 19.82$ ,  $p = .000$ ] and ego-involved participants [ $F(1, 97) = 18.41$ ,  $p = .000$ ] scored higher in task enjoyment compared to participants in the control group. There was no significant difference between the task-involved and ego-involved groups in both task enjoyment and free-choice behaviour scores (see Table 7.3). Contrary to H1, these findings show that under conditions of positive feedback, task-involved and ego-involved participants exhibited similar motivationally adaptive behaviour.

**Table 7.3: Means and Standard Deviations (in Parentheses) for Dependent Variables by Condition (Experiment 1).**

	Condition		
	Task-Involved	Ego-Involved	Control
Task Enjoyment	3.89 (1.04)	3.88 (1.13)	2.15 (2.74)
Free-Choice Enjoyment	3.11 (2.15)	3.16 (2.16)	2.05 (2.48)
Free-choice Behaviour (in Seconds)	134.33 (91.12)	117.75 (89.54)	102.87 (98.48)

### The Nature of Free-Choice Persistence

To examine differences in the nature of the participants' free-choice persistence (H2), zero-order correlations between free-choice behaviour and free-choice enjoyment within the three groups were calculated (Ryan et al., 1991). It was found that participants in the ego-involved condition ( $r = .24$ ) displayed a lower correlation than did the task-involved participants ( $r = .52$ ). Although the difference did not reach statistical significance ( $p > .05$ ), the results clearly resembled those of Ryan et al.'s (1991), with  $r = .45$  and  $.70$  for ego-involved and task-involved groups, respectively. Therefore, it was concluded that task-involved and ego-involved participants were not equally motivated intrinsically. For the task-involved participants, more than five times the amount of variance in free-choice behaviour was explained by free-choice enjoyment in comparison to ego-involved participants. Therefore, H2 is accepted.

The results of Experiment 1 suggest that task-involved and ego-involved participants report similar enjoyment and free-choice behaviour for the golf task, but show a difference in the degree to which their behaviour is intrinsically motivated. The lower correlation between free-choice behaviour and free-choice enjoyment for the ego-involved participants suggests that the free-choice behaviour of the ego-involved participants may be more internally controlling (e.g., identified or introjectedly regulated) rather than fully intrinsically motivated.



### 7.3 Experiment 2: Manipulation of Autonomy-Supporting and Controlling Communication Styles

The results of the previous experiment showed that under conditions of positive competence feedback, there was no difference between task-involved and ego-involved participants in their self-reported enjoyment and free-choice behaviour. These results corroborate assumptions of self-determination theory concerning the development of intrinsic motivation and internalisation (see Chapter 2). According to the theory, any event can be perceived as either having an autonomous functional significance or a controlling functional significance. Because both task-involved and ego-involved participants increased their indices of intrinsic motivation relative to the control group, it can be claimed that task and ego involvement can have an autonomous functional significance. However, the design of the previous experiment does not permit the conclusion that task and ego involvement can have a controlling aspect because a controlling type of communication was absent.

Research utilising the perspective of self-determination theory suggests that interpersonal communication styles can affect the intrinsic motivation of individuals (Deci & Ryan, 1985; Ryan & Deci, 2000a, 2000b). For example, teachers who communicate in an autonomy-supportive way, such as offering a choice, providing a rationale for the activity and acknowledging conflicts, may facilitate internalisation towards self-determination (autonomous functional significance), and thereby increase students' intrinsic motivation for engaging in the task (Deci et al., 1994). Teachers who communicate in a controlling way, that is, do not offer choice, and use more directive language like "should" and "ought to", will diminish students' intrinsic motivation for the task (controlling functional significance). On the other hand, the effects of goal involvement paired with communication styles on intrinsic motivation and enjoyment have not been examined in previous research. Therefore, Experiment 2 was designed to examine the effect of goals on enjoyment and intrinsic motivation under the conditions of autonomy vs. controlling communication with positive feedback. Similar procedures to Experiment 1 were employed, with a 2 (task vs. ego involvement) x 2 (autonomous vs. controlling communication) between-subjects

design. As in Experiment 1, dispositional goal orientations and general perceived physical competence were used as covariates.

Based on results from Experiment 1, and the research literature (Deci et al., 1994), the following hypotheses were tested:

1. Participants in the task-involved condition will display similar levels of task enjoyment and free-choice behaviour compared to those in the ego-involved condition.
2. Participants in the autonomous communication condition will display higher levels of task enjoyment and greater free-choice behaviour than those in the controlling communication condition.

### **7.3.1 Method**

#### **Participants**

The participants were 147 secondary school students (80 boys, 67 girls) from two comprehensive schools in the English Midlands. The students ranged in age from 11 to 16 years ( $M = 13.43$ ,  $SD = 1.26$ ). Because the experiment took place in normal school curriculum time, it was considered appropriate for the school Headteacher to give informed consent for participation. The experiment complied with ethical principles of the British Psychological Society.

#### **Procedure**

As in Experiment 1, students' dispositional goal orientations and general perceived physical competence were measured two weeks before the experimental session. In the experimental session itself, participants were randomly assigned to one of four conditions. Participants received either a task involvement induction ( $n = 79$ ) or an ego involvement induction ( $n = 68$ ). The goal involvement induction procedures, free-choice measures, and closing procedures were the same as those employed in Experiment 1. In addition, participants also received autonomous communication ( $n = 80$ ) or controlling communication ( $n = 67$ ). There were 44 participants in the task/autonomous group, 35 participants in the task/controlling

group, 36 participants in the ego/autonomous group and 32 participants in the ego/controlling group.

### Manipulation of Autonomous Vs Controlling Communication

After the participants had been told about the purpose of the task through the appropriate goal involvement induction (see Experiment 1), they were assigned to one of the two communication conditions. Those assigned to the autonomy condition were given a rationale, acknowledgement and choice concerning participation (Deci et al., 1994). The rationale for the participation in the task-involved condition was given as:

Seeking improvement is very important in daily lives. This is one of the main reasons you attend school. You seek to improve everything you do.

In the ego-involving condition, participants were told that

Competition is a fact of life. That is how society moves forward. You always seek to do better than others.

The acknowledgement of the participants' possible disinterest in the task was considered through the following statements for each condition:

I know that you may not like to improve (task involvement condition)/compete (ego involvement condition) in golf putting or even find the task boring. I can perfectly understand and accept that you might not find it very interesting or may not want to improve (task involvement condition)/compete (ego involvement condition).

After the rationale and acknowledgement were given, the participants were then given a consent form to sign to indicate their choice to take part. Five participants refused participation and were eliminated from the study.



In the controlling communication condition, no rationale, acknowledgement, or choice were given. In addition, words such as “should”, “must”, “have to” were used, for example “you should learn the techniques” and “you should putt now”.

### Measures

The three questionnaires used were essentially the same as those used in Experiment 1 with additional items assessing choice and responsibility in the first questionnaire (see Appendix 9).

*Perceived Autonomy.* To assess the perceived autonomy of the participants, they were asked how much choice and responsibility they perceived in engaging in the task. Specifically, they were asked ‘To what extent do you feel you have choice over the decision to do the golf putting?’ and ‘To what extent do you feel responsible over the decision to do the golf putting?’ Responses were given on 7-point scales ranging from not at all (1) to very much so (7).

## **7.3.2 Results and Discussion**

### **Manipulation Check**

The preliminary analysis showed that no significant differences were found in the dispositional goal orientations and general perceived physical competence between the four groups. Before the main analyses, a 2 (task and ego involvement) X 2 (autonomous and controlling communication) MANCOVA was used to evaluate the success of the goal involvement induction. Participants’ dispositional goal orientation and general perceived physical competence were used as covariates. There was no main effect for communication but there was for goal involvement [Wilks’  $\Lambda = .923$ ,  $F(2, 139) = 5.79$ ,  $p = .004$ ,  $\eta^2 = .08$ ]. No significant interaction effect between goal and communication was found. Follow-up tests indicated that the participants in the ego-involved condition scored higher in ego involvement than those in the task-involved condition [ $F(1, 140) = 10.74$ ,  $p = .001$ ,  $\eta^2 = .07$ ]. There was no significant difference in task involvement, replicating the findings from Experiment 1. The means and standard deviations are presented in Table 7.4.

**Table 7.4: Means and Standard Deviations (in Parentheses) for Manipulation Check Items by Condition (Experiment 2).**

Check Items	Goal Involvement		Communication	
	Task-Involved N = 79	Ego-Involved N = 68	Autonomy N = 80	Controlled N = 67
Task Involvement	4.31 ( .71)	4.21 ( .88)	4.18 ( .82)	4.35 ( .76)
Ego Involvement	2.34 (1.16)	3.06 (1.34)	2.58 (1.20)	2.79 (1.38)
Choice	4.76 (1.78)	4.75 (1.55)	5.35 (1.32)	4.03 (1.77)
Responsibility	4.95 (1.60)	4.84 (1.53)	5.48 (1.36)	4.20 (1.52)

The two measures of perceived choice and responsibility were used as manipulation checks for the communication induction. The results showed no main effect for goal involvement and no interaction effect between goal and communication on perceived choice and responsibility. However, there was a significant multivariate effect for communication [Wilks'  $\Lambda = .800$ ,  $F(2, 138) = 17.23$ ,  $p = .000$ ,  $\eta^2 = .20$ ]. Participants who received the autonomous induction reported higher perceived choice [ $F(1, 139) = 24.41$ ,  $p = .000$ ,  $\eta^2 = .15$ ] and felt more responsible [ $F(1, 139) = 27.27$ ,  $p = .000$ ,  $\eta^2 = .16$ ] than participants receiving the controlling induction (see Table 7.4).

In summary, the results of the manipulation checks suggested similar patterns to the goal involvement induction in Experiment 1. That is, participants who received task involvement induction endorsed a high task involvement and low ego involvement, whereas the ego-involved participants were primarily high task- and high ego-involved. In addition, the autonomous induction led participants to perceive high choice and to take more responsibility for their participation. This indicates that the manipulation was successful.

### Enjoyment and Free-Choice Behaviour

The means and standard deviations for task enjoyment, free-choice enjoyment and free-choice behaviour are presented in Table 7.5. Task enjoyment and free-choice enjoyment were entered as dependent variables and were analysed using a 2 x 2 (goal involvement x communication) MANCOVA. Neither a main effect for goal involvement nor an interaction was found. This indicated that there was no significant difference in task enjoyment and free-choice enjoyment of participants in the task-involved and ego-involved conditions. A significant main effect existed, however, for communication [Wilks'  $\Lambda = .930$ ,  $F(2, 133) = 5.03$ ,  $p = .008$ ,  $\eta^2 = .07$ ] for both types of enjoyment. Participants in the autonomy condition reported slightly greater enjoyment than did those in the controlling condition for both task enjoyment [ $F(1, 134) = 3.78$ ,  $p = .05$ ,  $\eta^2 = .03$ ] and free-choice enjoyment [ $F(1, 134) = 9.82$ ,  $p = .002$ ,  $\eta^2 = .07$ ].

**Table 7.5: Means and Standard Deviations (in Parentheses) for Dependent Variables by Condition (Experiment 2).**

	Goal Involvement		Communication	
	Task-Involved	Ego-Involved	Autonomy	Controlled
<b>Dependent</b>				
Task Enjoyment	4.05 (1.04)	3.66 (1.41)	4.09 (1.05)	3.63 (1.38)
FC Enjoyment	3.35 (1.61)	3.04 (2.21)	3.69 (1.47)	2.67 (2.19)
FC (in Seconds)	80.01 (96.00)	95.91 (98.80)	106.37 (101.03)	65.47 (88.59)

Note: FC = Free-Choice.

As far as free-choice behaviour was concerned, a one-way ANCOVA revealed that the main effect for goal involvement was not significant but the main effect for communication was [ $F(1, 137) = 4.50$ ,  $p = .036$ ,  $\eta^2 = .03$ ]. Participants in the autonomous condition engaged more in the task during the free-choice period compared to those in the controlling condition. There was no interaction between goal involvement and communication.



In summary, the findings of this study supported Hypothesis (H) 1 in that no differences on self-reported enjoyment and free-choice behaviour were found between those differing in goal involvement. In addition, H2 was also supported in that participants in the autonomous communication condition displayed higher levels of task enjoyment and greater free-choice behaviour than those in the controlling communication condition. The main effect analyses provided useful information on group differences on dependent variables, but it do not allowed a set of relationships between independent and dependent variables to be examined simultaneously (Tabachnick & Fidell, 1996). In order to gain a better understanding of the network of the relationships between the variables, further analyses were carried out using path analysis with EQS for Windows 5.7 (Bentler & Wu, 1998).

### **Path Analysis**

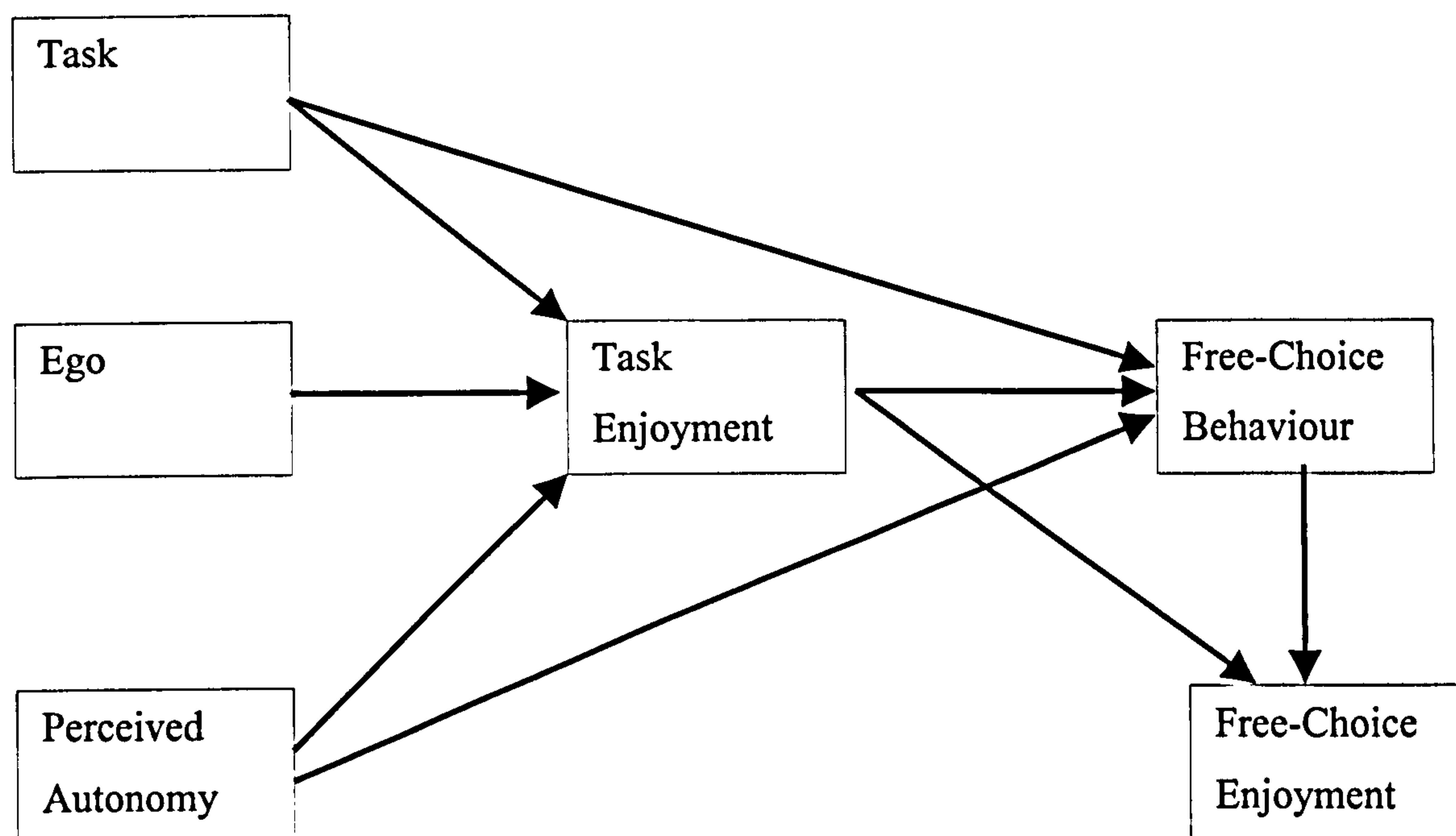
The correlations of all the variables are presented in Table 7.6. Task enjoyment was positively correlated with task involvement, perceived autonomy, free-choice behaviour and free-choice enjoyment. No relationships were found between ego involvement and task enjoyment, free-choice behaviour and free-choice enjoyment. The correlations between free-choice behaviour and free-choice enjoyment were high suggesting that participants who participated in the free-choice behaviour were intrinsically motivated.

In the proposed model (see Figure 7.1), task enjoyment is predicted in a positive direction by task involvement and perceived autonomy, and negatively by ego involvement. Free-choice behaviour is predicted directly by task involvement and perceived autonomy as well as indirectly through task enjoyment. Free-choice enjoyment is predicted directly by free-choice behaviour and indirectly by task involvement through task enjoyment, and perceived autonomy through task enjoyment.

**Table 7.6: Intercorrelations among Goals, Perceived Autonomy, Enjoyment and Free-Choice Behaviour**

	1	2	3	4	5
<b>Overall Sample</b>					
1. Task					
2. Ego	.19				
3. Per. Autonomy	.12	.14			
4. Task Enjoyment	.43**	.02	.38**		
5. FC Beh	.26**	.08	.33**	.37**	
6. FC Enjoyment	.26**	-.08	.38**	.50**	.74**
<b>Autonomy Condition</b>					
1. Task					
2. Ego	.30*				
3. Per. Autonomy	.27*	.21			
4. Task Enjoyment	.44**	.09	.30*		
5. FC Beh	.10	.22	.22	.33*	
6. FC Enjoyment	.21	.23	.29*	.42**	.76**
<b>Controlled Condition</b>					
1. Task					
2. Ego	.09				
3. Per. Autonomy	.04	.13			
4. Task Enjoyment	.45**	-.02	.31*		
5. FC Behaviour	.45**	-.06	.31*	.34*	
6. FC Enjoyment	.33*	-.29	.26	.47**	.70**

Note: \*  $p < .05$ , \*\*  $p < .01$ ; Per = Perceived; FC = Free-Choice.



**Figure 7.1.** Proposed model of the network of relationships between goal involvement, perceived autonomy, enjoyment and free-choice behaviour.

The adequacy of the model was determined by the fit indices provided by EQS. These were Comparative Fit Index (CFI), Goodness of Fit Index, (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Residual (RMSR), and Root Mean Square Error of Approximation (RMSEA). For the first three indices, values should be above .95 and the last two residual indices need to be below .06 to be acceptable (Hu & Bentler, 1999). In addition, model modifications can be investigated through the use of the Wald and Lagrange Multiplier (LM) Tests. The Wald Test assesses whether any free parameters of a model can be restricted without substantial loss of information (Bentler, 1995). The LM Test tests the opposite, that is, whether any parameters that were set to zero in the model are, in fact, not zero. It tests the effect of adding free parameters to a model (Bentler, 1995). It is suggested that although these post-hoc modifications are influenced by chance, the information can be useful in providing insight to variations of the hypothesised model. Changes are usually advised only when theoretically or logically justified.

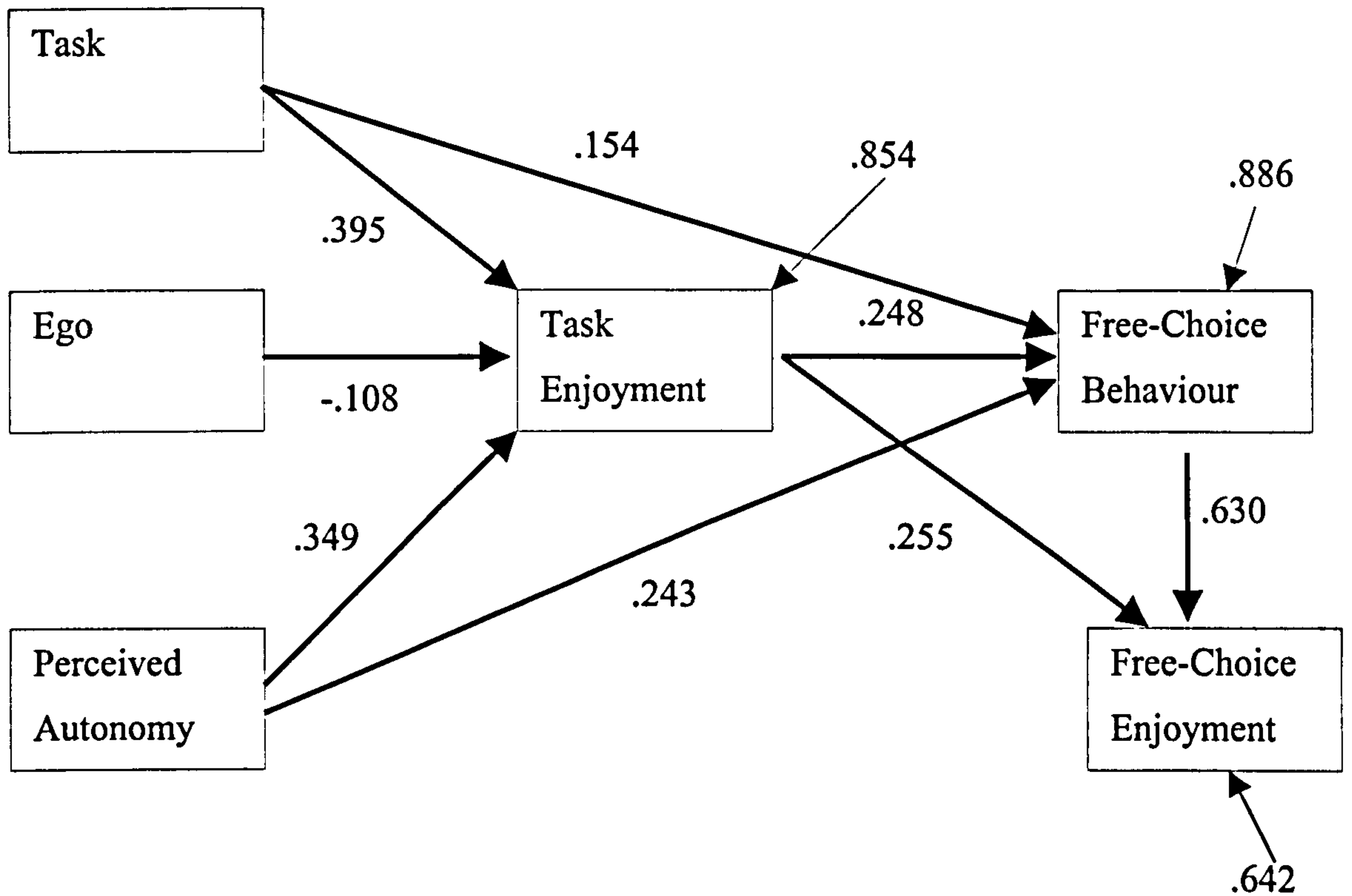


Results of the path analysis are shown in Figure 7.2. The fit indices obtained show a satisfactory fit between the proposed model and the data observed ( $\chi^2 (6) = 8.52$ ,  $\chi^2/df = 1.42$ , CFI = .983, GFI = .975, AGFI = .913, RMSR = .053, RMSEA = .066). Furthermore, the Wald Test suggested the paths from ego involvement to task enjoyment, and from task involvement to free-choice behaviour, could be dropped.

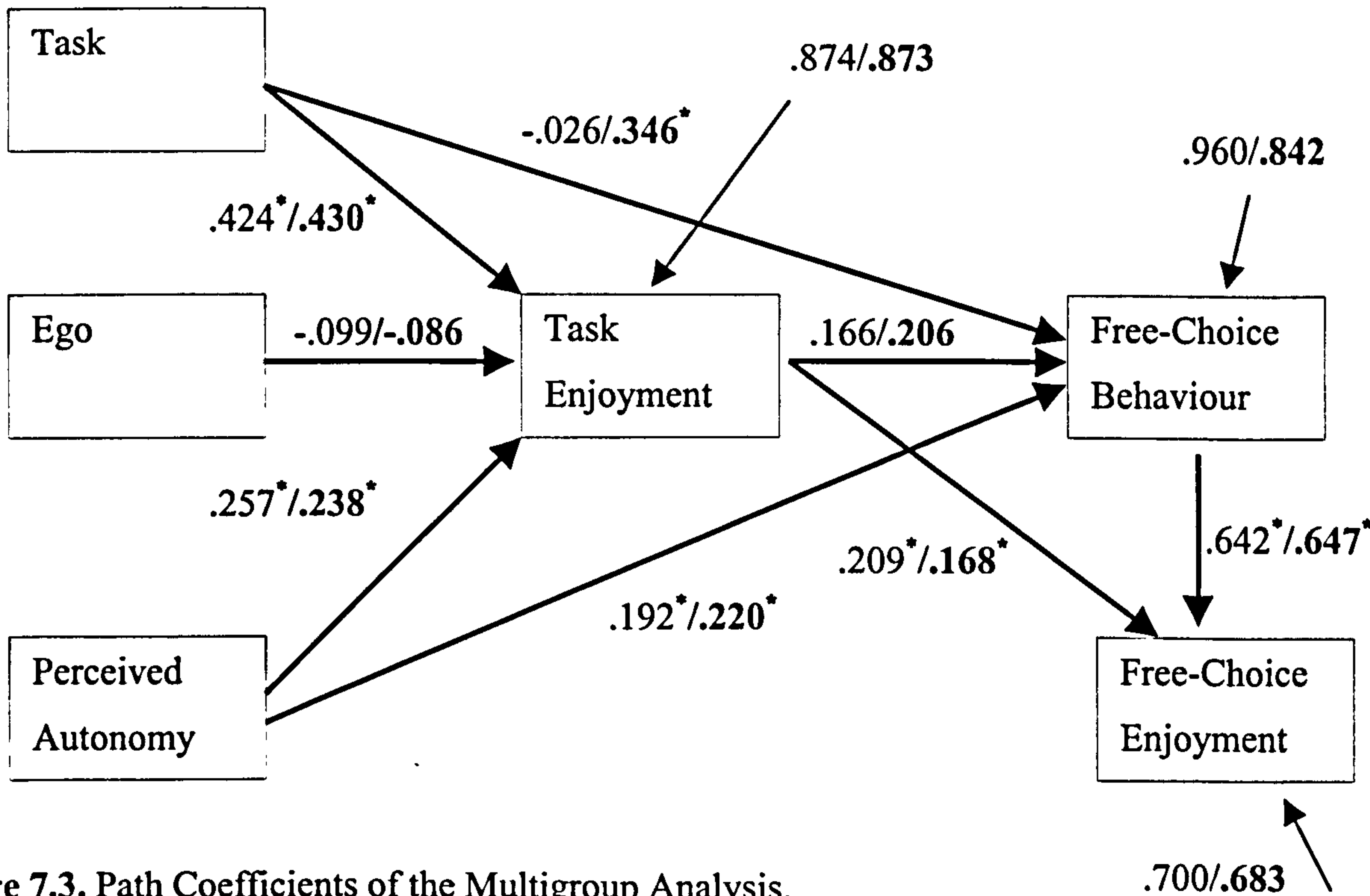
In general, the results of the path analysis confirmed the earlier analyses that perceived autonomy was the most important predictor of free-choice behaviour. Task involvement also had a significant impact on free-choice behaviour, however the effect was mediated by task enjoyment. Ego involvement was not related to task enjoyment and free-choice behaviour. These suggest that the non-significant findings between the task-involved and the ego-involved groups on the dependent variables might be due to perceived autonomy.

In the next step of the analysis, the differences between the autonomy and controlling groups were tested. The null hypothesis was that there would be no differences in the path coefficients between the two groups. Therefore, all the path coefficients were constrained in a multi-group analysis. The results showed that the fit of the model was unsatisfactory ( $\chi^2 (20) = 29.40$ ,  $\chi^2/df = 1.47$ , CFI = .927, GFI = .915, AGFI = .822, RMSR = .114, RMSEA = .069). The LM Test suggested that the equality constraints on the path coefficients between task involvement and free-choice behaviour, and between free-choice behaviour and free-choice enjoyment should be released for the model to be fitted equally well for both groups.

Both constraints were released and the fit of the model improved ( $\chi^2 (18) = 22.13$ ,  $\chi^2/df = 1.23$ , CFI = .968, GFI = .936, AGFI = .850, RMSR = .097, RMSEA = .049). The resulting path coefficients are shown in Figure 7.3. There was a significant difference between the path linking task involvement and free-choice behaviour. Specifically, task involvement directly predicted free-choice behaviour in the controlling condition ( $\beta = .35$ ) but not in the autonomy condition ( $\beta = -.03$ ). This is a significant finding in that under the condition when the communication was controlling, task involvement facilitates free-choice behaviour.



**Figure 7.2.** Path coefficients of the hypothesised model of the overall sample.



**Figure 7.3.** Path Coefficients of the Multigroup Analysis.  
 Note: Path coefficients shown for Autonomous/Controlled; \* $p < .05$ .

## 7.4 General Discussion

Few studies in sport and physical domains have examined the behavioural markers of intrinsic motivation or used self-determination theory to test for the nature of free-choice behaviour. The results of the two experimental studies reported in this chapter showed two important findings. First, in inducing ego involvement, task involvement also increased. This suggests that task-involved strategies might be useful in achieving ego-oriented ends. Consequently, no differences were found between ego- and task-involved participants on motivational and affective markers, including free-choice behaviour. Second, in contrast with many studies of intrinsic motivation, the nature of the free-choice behaviour was examined in the first experiment. It was found that ego-involved participants were operating at a more internally controlling form of motivation than task-involved participants. This might have implications for task choice in the future and for persistence over time and both notions require testing. In addition, results showed that qualitative distinctions between types of extrinsic motivation, as proposed in self-determination theory, are informative and researchers must not assume that free-choice behaviour is necessarily self-determined. Greater emphasis on self-determination theory constructs and its measurement of intrinsic motivation, therefore, are recommended.

Through the manipulation checks, it was found that the task-involved participants adopted a high task involvement and a low ego involvement. However, the ego-involved subjects were predominantly high task and high ego. This finding points to the importance of using manipulation checks in experimental studies and researchers should not assume that the manipulation will create a high/low involvement state. Why did ego-involved participants endorse high task involvement along side ego involvement? One reason could be the accessibility of the constructs (Higgins et al., 1982). This is logical because Nicholls (1989) found that children under the age of 12 tend to employ a less differentiated conception of ability. With the young age group studied here, task involvement is highly accessible to them thus they endorsed it. Secondly, a reason could be the PE context in which the experiment was carried out. For example, in one of the schools, the motto of the PE lessons was to do



one's best in learning and co-operate with others, and this was explicitly displayed on the notice board and reinforced by the teachers. Therefore, students responded in a socially desirable way to the expectations of the environment. Another reason could be because all the participants were not taught golf either in school or outside school, and consequently felt that they needed to learn the techniques of golf putting in order to beat others. Therefore they adopted a high task involvement together with high ego involvement. In case they did not succeed in beating others, at least they could protect their self-esteem by trying their best or by mastery of the task. Task involvement in this case could act as a defence mechanism. Future investigations into the factors influencing goal involvement states are required in order to understand the mechanisms involved.

Another explanation for the findings is that ego involvement was conceptualised solely in terms of normative evaluation and social comparison, but not hinged upon self-esteem contingencies such as those used in Ryan et al.'s (1991) study. This normative performance goal was seen as less threatening to the self and therefore the participants may not have felt under too much pressure to perform well and therefore enjoyed the experience of being involved in the task. Therefore, they persisted during the free-choice period, perhaps to demonstrate to themselves that they could do better. In this case, the free-choice behaviour would be internally controlled rather than truly intrinsically motivated. This is supported by the low correlation between free-choice behaviour and free-choice enjoyment of the ego-involved participants. That is, although they engaged in the free-choice behaviour, they might not be successful in showing to themselves that they are good in terms of their own criteria, or, they might have succeeded but no one was there to witness their success. In both cases lower enjoyment was reported and resulted in the lower correlation.

Finally, according to the proposal of Elliot and his colleagues (Elliot, 1997; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) on the trichotomous conceptualisation of goals, it is possible that participants in this study were operating with an approach performance goal rather than avoidance performance goal. The performance-approach goal focuses on gaining favourable judgement of competence,

and can produce an enhancement effect on intrinsic motivation similar to the mastery goal (Rawsthorne & Elliot, 1999). It is proposed that future research should take into account approach and avoidance goals.

Participants in the control group adopted a high task involvement and low ego involvement profile, with high pre-task perceived competence, lower intrinsic motivation, and significantly lower enjoyment compared to the two other experimental groups. This suggests that creating an ego-involving or task-involving situation is better than just focusing on the task. This points to the importance of situational factors in influencing cognitive, affective and behavioural responses in performing a sport task. Future research should examine the role of perceived environment, such as perceived motivational climate or perceived autonomy in the adoption of achievement goal in the experimental context.

In the first experiment, task and ego involvement increased markers of intrinsic motivation relative to the control group. Therefore, it can be claimed that task and ego involvement can both have an autonomous functional significance. However, the design of the experiment did not permit the conclusion that task and ego involvement can have a controlling functional significance because a controlling type of communication was not tested. The second experiment was therefore designed to test the effect of both autonomous and controlling forms of interpersonal communication as well as task and ego involvement. Interestingly, it was found that communication, not goals, affected enjoyment and free-choice behaviour such that the autonomous communication style had a more positive motivational effect. This shows that self-determination theory, rather than achievement goal theory, might be a more explanatory approach for youth physical activity participation.

According to self-determination theory (Deci & Ryan, 1985, 1987), autonomy-supportive communication facilitates intrinsic motivation whereas controlling communication undermines it. The findings of the second experiment supported this. The autonomy-supportive context is likely to satisfy the needs for self-determination, thereby facilitating the process of internalisation of the behavioural regulation. More importantly, this context can be easily manipulated through

providing a rationale for engaging in the activity, acknowledgement of conflicts, and conveying choice. On the other hand, a controlling context leads to a more introjected behaviour which in turn undermines intrinsic motivation.

The path analysis offered additional insights into the relationships between the independent and dependent variables. First, the results showed that the basis of intrinsic motivation is concerned with perceived autonomy in the environment as indicated by the direct path from perceived autonomy to the markers of intrinsic motivation. This implies that future research should take into account perceived autonomy in the environment in examining intrinsic motivation. Second, the results also showed that under controlled communication, free-choice behaviour was directly influenced by task involvement, whereas this path was not found in the autonomy-supportive context. This shows that task involvement acts as a resistant to controlling communication and thus may contain an autonomous functional significance. That is, task involvement enhances intrinsic motivation even when the social context does not support self-determination. This supports the claim that task goals should be promoted rather than ego goals (Duda, 1993; Dweck & Leggett, 1988; Treasure & Roberts, 1995).

The results of the second experiment show that the influence of interpersonal context is important in an achievement setting. With an autonomy-supportive context, students will perceive more choice over the activity, and are more likely to take responsibility for their engagement in the task. This supports self-determination and leads to the enhancement of intrinsic motivation. On the other hand, a controlling context that does not support autonomy is likely to undermine intrinsic motivation. The implication for practitioners is that creating an autonomy supportive ambience is key to optimise intrinsic motivation of the students.

In summary, the present study suggests that, like any other events, task and ego goals can be perceived as autonomous or controlling. As a consequence, task and ego goals can have undermining or enhancing effects on intrinsic motivation. The relationship between goals and intrinsic motivation appears to be more complex than it is thought. Further studies are required to understand the mechanisms involved. In



addition, this study also highlights some methodological issues concerning the measure of intrinsic motivation using self-reported measures and free-choice paradigm. Furthermore, perceived autonomy in the environment may be more important than creating a different goal involvement state in enhancing intrinsic motivation on an activity. Finally, although this study cannot comment on what the functional significance of task and ego goals is, it can state that the functional significance of goals can be both controlling and autonomous depending on how they are communicated.

A few limitations of the study need to be mentioned. Firstly, the experiments were conducted in the school PE setting; there were constraints of time and space, and number of students in the study. For example, the free-choice period should be longer to differentiate between those who were intrinsically motivated and those who were not. Secondly, free-choice behaviour should be measured through the use of one-way mirror or hidden camera to yield a more accurate measurement instead of the method used in this study. Thirdly, the reasons for participating in the free-choice period were not captured qualitatively. This information could shed light on the differential cognitive processes involved in the free-choice participation. Finally, the different performance goals in terms of approach-avoidance dimension were not investigated.

## CHAPTER VIII

### General Discussion, Implications, and Conclusions

#### 8.1 Introduction

This thesis examined the roles and relationships of conceptions of sport ability, achievement goals, and intrinsic motivation in the context of PE. An attempt was made to examine the psychometric properties of the Conceptions of the Nature of Athletic Ability Questionnaire (CNAAQ) for children. In addition, the causal influence of sport ability beliefs on achievement goals, as well as achievement goals on intrinsic motivation, were tested. In this final chapter, findings from the five studies are discussed, followed by limitations of the current research, and implications for the practice of PE. A summary of the main findings from each study is presented in Table 8.1.

#### 8.2 Psychometric Properties of the CNAAQ

In Chapter 2, it was revealed that some studies that have employed Sarrazin et al.'s (1996) CNAAQ indicate low internal consistency for certain sub-scales of the instrument (e.g., Stable and Specific sub-scales in Biddle et al., 1999a). Moreover, the construct validity, and potential differences in the equivalency of the measurement items in terms of gender and age, have largely been ignored. The first two studies of this thesis, therefore, were designed to address these issues. In Stage 1 of Study 1, a small-scale interview study was conducted with eight athletes to explore their conceptions of athletic/sport ability. The aim was to examine the extent to which the constructs measured in the CNAAQ are salient for young people. It was found that the two beliefs, entity and incremental, existed. That is, young people may think about their sport ability as something that they are born with (entity belief) and/or something that they have to practise and train to improve (incremental belief). However, beliefs related to generality and specificity did not emerge.

**Table 8.1: Summary Findings from the Individual Studies**

Study	Purpose	Design	Analysis	Participants	Instruments	Findings
1	To examine the psychometric properties of CNAAQ and its use in predicting physical activity intentions	Stage 1: Interviews	Content Analysis	8 athletes	Interview Guide	Confirmed incremental and entity beliefs exist for young people. However, the dimensions regarding generality and specificity were not mentioned.
		Stage 2: Cross-sectional Questionnaire	Content Analysis	39 school students	CNAAQ	Five problematic items were identified as lacking face validity.
		Stage 3: Cross-sectional Questionnaire	Confirmatory Factor Analysis	352 school students	CNAAQ	Six competing models were compared based on the findings of the previous two stages and previous research. Model 6 with four first-order factors (Stable, Gift, Learning and Improvement) and two higher-order factors (Entity and Incremental) provided the best fit to the data. Convergent validity and discriminant validity were supported together with satisfactory internal consistency. The improved version was named CNAAQ-2
		Cross-sectional Questionnaire	Stage 4: Path analysis	352 school students, as in Stage 3	CNAAQ, TEOSQ, PSPP-PC, Intentions items	Task orientation was predicted by incremental beliefs and entity beliefs predicted ego orientation. Intentions to be physically active were predicted by goal orientations indirectly through perceived competence, and directly by task orientation.



**Table 8.1: Cont.**

Study	Purpose	Design	Analysis	Participants	Instruments	Findings
2	To examine the invariance of the factor structure of the CNAAQ-2, and to test a model predicting amotivation using perceived competence as a moderator	Cross-sectional Questionnaire	Multi-sample analysis and path analysis	2969 school students	CNAAQ-2, TEOSQ, PSPP-PC, PSPP-PSW, PLOC, physical activity participation	The factorial validity of the CNAAQ-2 and the invariant factor structure across gender and three age groups were confirmed. Results of path analysis showed that amotivation is predicted directly and indirectly by beliefs, and indirectly by goal orientations. Specifically, entity beliefs directly predicted amotivation, and task orientation negatively predicted amotivation.
3	To identify subgroups of young people with distinctive motivational profiles	Cross-sectional Questionnaire	Cluster Analysis	2510 school students, as from Study 2	CNAAQ-2, TEOSQ, PSPP-PC, PSPP-PSW, PLOC, physical activity participation	Five distinct clusters with different motivational patterns were identified. Clusters high in task orientation, incremental beliefs, perceived competence and RAI were generally more physically active and had higher perceived physical self-worth. High ego may not be detrimental if coupled with high task orientation. Those 'at risk' clusters were mainly females from the older age groups who had high entity beliefs, and were low in task orientation, incremental beliefs, perceived competence, physical activity level and physical self-worth.

Table 8.1: Cont.

Study	Purpose	Design	Analysis	Participants	Instruments	Findings
4	To examine the effects of athletic ability beliefs on goal adoption, cognition, affect, and behaviour	Experimental	MANOVA	Pilot study N = 53 Main study N = 123 school students	Manipulation check items, items from CNAAQ-2, goal choice, POSQ. Items for affect, perceived competence, attributions, behavioural choice	Causal link between sport ability beliefs and goal adoption was confirmed. Entity beliefs led to adoption of ego goals and incremental beliefs led to the adoption of task goals. When faced with failure, entity theorists were more likely to make ability attributions compared to incremental theorists. The results did not show any difference between the two belief groups in affective reactions, effort attributions or behavioural markers.
5	<u>Experiment 1</u> : To examine the effects of goal involvement on intrinsic motivation <u>Experiment 2</u> : To examine the effects of goal involvement and interpersonal communication on intrinsic motivation	Experimental	MANCOVA	Experiment 1 N = 98 Experiment 2 N = 147	POSQ, PSPP-PC, Manipulation check items, items from POSQ, items for affect, perceived competence, enjoyment, and behavioural measure of intrinsic motivation	<u>Experiment 1</u> : No difference between task-involved and ego-involved participants in self-reported enjoyment and free-choice behaviour. The nature of free-choice behaviour of ego-involved participants may not be fully intrinsically motivated. <u>Experiment 2</u> : Similar findings to Experiment 1. In addition, participants in autonomous communication condition showed higher task enjoyment and free-choice behaviour compared to those in the controlling communication condition.

The content analysis in Stage 2 identified five problematic items that lacked face validity. In Stage 3, 352 school children were administered the CNAAQ. Based on the findings of previous stages and theoretical considerations, six competing measurement models were proposed. Confirmatory Factor Analysis was applied to the six models and the results revealed that the hierarchical model with four-first order factors (Learning, Improvement, Gift, and Stable) and two higher-order factors (Incremental Belief and Entity Belief) provided the best fit to the data. Convergent validity and discriminant validity were supported together with acceptable reliability. The revised version of the CNAAQ was labelled CNAAQ-2.

The factor structure of the CNAAQ-2 was further confirmed with a large sample in Study 2. In addition, the invariance of the factor structure was supported across males and females, and across three age groups. This suggests that the CNAAQ-2 possesses sound psychometric properties in assessing sport ability beliefs among children and youth in their teen years.

The development of the CNAAQ-2 makes an important contribution to sport and exercise psychology research as it offers a theoretically sound and methodologically valid and reliable measure. In Dweck's theory of intelligence, an incremental theory of intelligence is a view that intelligence is a malleable, increasable, and controllable quality. An entity theory of intelligence is a belief that intelligence is a fixed and uncontrollable quality. The confirmation of the two higher-order factors of entity and incremental beliefs in the present research is consistent with the theoretical proposals of Dweck and her colleagues (Dweck, 1986, 1999; Dweck & Leggett, 1988). Dweck suggests that implicit theories create goals and subsequent motivational patterns in the academic domain. Given evidence for the validity of the CNAAQ-2 in measuring incremental and entity beliefs in the physical domain, future research is able to test hypotheses derived from Dweck's implicit theory in sport in relation to other theoretically relevant constructs such as self-esteem, attributions, and affect, as well as behavioural indicators such as persistence and effort.



From a practical point of view, the CNAAQ-2 can be used to measure sport ability beliefs in various physical activity settings. For example, it could be used as a baseline measure of individuals' ability beliefs in intervention programmes, or to examine the possible changes in sport ability beliefs over time.

### **8.3 The Role of Conceptions of Sport Ability**

According to Dweck's implicit theories of intelligence (Dweck, 1986; 1999; Dweck & Leggett, 1988), beliefs that people hold about their intelligence create goals they pursue in achievement striving. Specifically, an entity (or fixed) belief leads individuals to be concerned with showing they are 'smart' and should foster performance (ego) goals. An incremental (changeable) belief should lead individuals to be concerned with developing their competence and therefore should promote learning (task) goals. Studies 1, 2 and 4 tested this assertion in the physical domain using the revised CNAAQ as a measure of conceptions of sport ability. The results on the whole showed that children were more likely to endorse incremental beliefs over entity beliefs. Since schools and teachers often emphasise the role of learning and improvement in academic striving, endorsement of incremental beliefs could be seen as highly desirable or natural in school children. In addition, both beliefs were found to be largely independent constructs, rather than bipolar, as suggested by Dweck. Given that task and ego orientations are also orthogonal (Nicholls, 1989), and that conceptions of sport ability are linked to achievement goals, the findings that the two sport ability beliefs are independent of each other contributes to some coherence to the relationship between beliefs and goals.

Studies 1 and 2 provided some support for the role of sport ability beliefs as predictors of goal orientations. In Study 1, it was found that incremental beliefs predicted task orientation and accounted for 15.4% of the variance in task orientation. In Study 2, a latent model with full indicators was tested with perceived competence as a moderator. Incremental beliefs accounted for 42.2% and 42.4% of variance in task orientation for the high and low competent groups, respectively. Therefore,

incremental beliefs predict task orientation regardless of levels of perceived competence. The findings in Studies 1 and 2 also showed that ego orientation was associated with entity beliefs. However, the variance explained was small (3.14%) in Study 1. In Study 2, however, entity beliefs explained 15.9% of the variance in ego orientation in the high perceived competence group, compared to 1.4% in the lower group. This highlights that perceived competence may influence the relationship between entity beliefs and ego orientation. That is, when entity theorists feel that they are physically competent, they may display an ego orientation.

The findings of the present investigation are in accordance with previous research (Biddle et al., 1999a; Lintunen et al., 1999; Sarrazin et al., 1996). For example, Biddle et al. (1999a) found that beliefs that sport ability is fixed and general predicted ego orientation and accounted for 4.6% variance, whereas beliefs that sport ability is determined by learning and improvement predicted task orientation and accounted for 12.8% variance. In addition, entity beliefs were found to be related to perceived competence.

At this initial stage of research in sport ability beliefs, this is considered an important finding for two reasons. First, Dweck's work on implicit theories focused on how individuals respond to failure conditions in achievement settings (see Dweck, 1999), which is more state-like behaviour. The first two studies of the present thesis examined the trait-like tendency of individuals in general, which has not been the major focus of Dweck's work. Second, in Dweck's proposals (Dweck & Leggett, 1988), perceived competence does not moderate the relationship between entity beliefs and ego orientation. However, Study 2 found that perceived competence played a role in moderating the effects of entity beliefs on ego orientation. This may be related to the first point that Dweck's work only focused on the state-like behaviour when faced with setbacks rather than a trait-like tendency. It could be that at a trait level, perceived competence is a key deciding factor as to whether entity theorists orient towards ego goals or not. Therefore, the finding is considered an important step forward in the understanding of motivated behaviour in the physical domain.

In addition to linking ability beliefs to goals, the results in Studies 1, 2 and 3 showed that ability beliefs had a direct impact on individuals' motivational patterns. Incremental beliefs, through task orientation, predicted intentions to be physically active in Study 1, and negatively predicted amotivation in Study 2. Entity beliefs were found to predict amotivation directly. In addition, Study 3 established that the most adaptive clusters were those with high incremental beliefs. Consistent with previous research in the academic and physical domains (Biddle et al., 1999a; Dweck & Leggett, 1988; Hong et al., 1999; Lintunen et al., 1999), the present findings support the view that incremental theories of ability are associated with more adaptive motivational patterns, and believing that ability is fixed appears to be less motivationally adaptive. One reason could be that entity beliefs do not allow feelings of confidence and control over future outcomes, especially when perceived competence is low, thus resulting in less adaptive responses. In contrast, incremental beliefs, through the pursuit of task goals, allow the feeling that success is under one's personal control (Duda & Nicholls, 1992; Nicholls, 1989), hence, resulting in more adaptive patterns.

In Study 4, the success of the belief induction indicated that sport ability conceptions could be manipulated, at least temporarily. This is in line with Dweck's view that although beliefs can be relatively stable personality traits, they can be highly dynamic as well (Dweck, 1999). In other words, individuals may have preference for one belief over another, but they also understand the opposing belief, and sometimes endorse it, depending on situational factors.

The causal link between sport ability beliefs and adoption of goals was supported in Study 4. The results showed that entity theorists were more likely to adopt performance goals, particularly after encountering failure feedback, and incremental theorists were more likely to endorse learning goals regardless of feedback. Before encountering failure feedback, entity and incremental theorists were found to show high intentions for learning from the task. This suggests, in achievement situations such as PE and sport, that individuals who perceive substantial progress in their skill levels may have a preference for learning goals. It is only when they stop progressing or encounter difficulty, that entity theorists are faced with two



alternatives. First, they can avoid the task because they see no point in continuing, and this is supported by the findings in Study 2 in that entity beliefs directly predicted amotivation. When this happens, those entity theorists with low perceived competence may develop a weak orientation in both learning and performance goals, as found in the amotivated group in Study 3. Second, they can choose easy performance goals that allow them to show that they are 'good', but at the expense of learning opportunities. The findings in Study 4 confirm Dweck's proposal that implicit theories are more evident when individuals are faced with setbacks, and view failure as a threat to self-esteem.

In addition, Study 4 also tested whether individuals differing in entity and incremental beliefs show different cognitive, affective, and behavioural responses when faced with failures. In classroom research, Dweck and her co-workers (Dweck, 1986, 1999; Dweck & Leggett, 1988, Hong et al., 1999) predicted more negative outcomes for entity theorists in comparison to incremental theorists under failure conditions. This is because those holding strong entity beliefs will doubt their stable ability after failures, whereas those with incremental beliefs will see failures as temporary setbacks. Consequently, more negative cognition, affect, and behaviour would be expected for entity theorists in such circumstances.

In terms of attributing outcomes for performance, the findings in Study 4 showed that entity theorists were more likely to attribute failure to ability compared to the incremental theorists. This coincides with Dweck's (1999) predictions in classroom-based research. As entity beliefs raise individuals' concerns about how good they are in performing the task, the task becomes a measure of their ability. Therefore, failures will indicate that they are not good enough and lack ability. On the other hand, incremental theorists should be focusing on effort and strategy in the face of difficulty. However, the results in Study 4 did not support this hypothesis. It was found that there was no difference in effort attributions between the entity and incremental groups. It is possible that the participants in the incremental group viewed effort as irrelevant in contributing to their poor performance because they were not given much time to practise the task. In addition, it was found that there were no differences in affective outcomes and behavioural indicators between the two groups.

One possible explanation could be that the participants enjoyed the task itself thus reducing negative affect. This is supported by high scores for both groups on self-reported enjoyment and the equal likelihood of registering for training courses and taking part in competition. It could also be due to the fact that both groups endorsed incremental beliefs. It is recommended that further research to be carried out to investigate these issues.

With regard to gender differences, boys appeared to have higher incremental beliefs and higher perceived competence compared to girls. The findings in Study 4 showed that boys were more certain that they can improve their sport ability, they also reported higher enjoyment and showed higher intentions for future participation. The cluster analysis in Study 3 complemented these findings in that those 'at risk' clusters were those with low incremental beliefs and low perceived competence, which were over-represented by girls in the older age group. On the other hand, those most adaptive clusters comprised students with high incremental beliefs and high perceived competence and contained more boys than girls. The findings of the two studies suggest that there is a need to increase girls' incremental beliefs and perceived competence in the physical domain.

Finally, as regard to the determinants of goal adoption, some researchers (e.g., Harwood et al., 2000) suggest that the conception of the differentiation of ability, as proposed by Nicholls (1989), may not be the direct determinant of achievement goals in sport. Instead, it is individuals' personal theories that determine achievement goals. The present investigation agrees with this view, and provides empirical evidence to support the view that personal theories of ability play an important role in driving achievement goals.

## **8.4 The Role of Achievement Goals**

Achievement goal theory predicts that task orientation is positively linked to adaptive motivated behaviours regardless of level of perceived competence (Dweck &

Leggett, 1988; Nicholls, 1989). When individuals are oriented towards a task (learning) goal, their focus is on developing abilities or competence, and they are more likely to think about what is required to improve their skills. Failures and obstacles are seen as part of the learning process in providing further information to guide learning. This should lead to an increased focus on the task and self-mobilisation that characterises adaptive motivated behaviours (Heyman & Dweck, 1992). The first three studies of this thesis supported this assertion. In Study 1, it was found that task orientation directly predicted intentions to be physically active. However, task orientation also predicted intentions to be physically active indirectly through perceived competence. The link between task orientation and perceived competence has been found in previous studies (Biddle et al., 1999a; Lintunen et al., 1999). These authors suggested that this link might be due to the way perceived competence is measured. For example, the sport competence sub-scale of the Physical Self-Perception Profile (Fox & Corbin, 1989) contains items referring to 'learning new skills', 'confidence' and 'good'. To a task-oriented person, these items could be interpreted as task-related and self-referenced. It appears that future research needs to look into the measurement of perceived competence in terms of differentiating task-related or ego-related competence.

The review in Chapter 2 highlighted that few studies had examined the relationship between actual motivation-related behaviours and achievement goals in the physical domain. The construct of amotivation, which refers to the relative absence of motivation is virtually unexplored in the achievement goal literature. In Study 2, task orientation was found to have a strong and negative relationship with amotivation. The findings support the motivationally adaptive nature of task orientation. In Study 3, it was also found that high task-oriented individuals had more motivationally adaptive profiles. They were more likely to have higher perceived autonomy, higher levels of physical activity participation, higher perceived competence, and higher perceived physical self-worth, and were not likely to be amotivated, compared to those individuals with low task orientation.

In terms of ego-orientation, theory predicts that it should be negatively linked to adaptive motivated behaviours (Dweck & Leggett, 1988; Nicholls, 1989).



Individuals who are oriented towards ego (performance) goals tend to focus on gaining positive judgements and avoiding negative judgements of their abilities in an achievement setting. They are concerned with how much ability they have and whether they can outperform others. Therefore, failure is seen as a personal deficiency to imply that one lacks ability. This should lead to withdrawal of effort and subsequently produces less adaptive motivated behaviour (Heyman & Dweck, 1992). This means that maladaptive motivational patterns are evident when individuals have doubts about their perceived competence. When perceived competence is high, ego-oriented individuals should exhibit similar adaptive motivational patterns as task-oriented individuals.

In Study 1, it was found that perceived competence mediated the effects of ego orientation on intentions to be physically active. This is in accordance with the prediction that ego-oriented individuals with high perceived competence would show adaptive motivation. Goudas et al. (1994b) and Duda and Nicholls (1992) also found a small but significant correlation between these two variables. Some researchers suggest that if ego-oriented individuals with high perceived competence exhibit adaptive patterns, and those with low perceived competence exhibit maladaptive patterns, there should be a moderating effect of perceived competence between ego orientation and behaviour (e.g., Butler, 1999; Kaplan & Midgley, 1997). Study 2 was therefore designed to examine the moderating effect of perceived competence between achievement goals and amotivated behaviour. Instead of using mean-split or median-split to classify individuals into high and low competence groups, this study took the upper and lower quartile of the sample to create groups more representative of high and low perceived competence groups. It was suggested that these extreme groups would be able to provide a clearer picture of the moderating role of perceived competence.

Contrary to prediction, ego orientation did not predict amotivation in the low perceived competence group. It appears that the effects of low perceived competence for high ego-oriented individuals may be complex and require further study. It could be that performance goals can be further differentiated into approach and avoidance performance goals, as suggested by Elliot and Harackiewicz (1996), which may

produce different motivational patterns. A performance-approach goal, which focuses on gaining positive judgements of normative competence, may produce adaptive motivational patterns similar to task goals. However, a performance-avoidance goal, which focuses on avoiding negative judgements of normative competence, is likely to produce less adaptive motivational patterns. Future study should examine the trichotomous conceptualisation of achievement goals proposed by Elliot and Harackiewicz (1996).

In Chapter 2, an extensive amount of research examining the correlates of dispositional goal orientations was identified. These studies support the general predictions of achievement goal theory in that task orientation leads to more adaptive motivational patterns, whereas ego orientation leads to less adaptive motivational patterns. Since the two goal orientations have different cognitive and motivational implications, research should examine the interactive effect within individuals rather than study the two constructs independently. Moreover, in line with the orthogonal relationship between the two goal orientations, researchers have suggested that a goal profile analysis (Fox et al., 1994) to be conducted to examine the interactive effect of the two goal orientations. Typically, four mutually exclusive groups, high task/high ego, high task/low ego, low task/high ego, and low task/low ego are formed using either mean- or median-split methods. However, it was argued that this way of artificially imposing a structure on the observed data might not fit 'reality' (see Chapter 2). Therefore, alternative methods are required to check the existence of such goal profiles in the population.

Using cluster techniques, the findings in Study 3 confirmed the presence of high task/high ego, high task/low ego, and low task/low ego groups in the student population. However, the low task/high ego group could not be identified in a straightforward manner. It was found that almost 40% of the population had either a moderately low task/high ego or low task/moderately low ego profile. It was also shown that if a mean-split method was used to create the goal profile groups, only 34.1% of the participants were correctly classified into the matching goal profile groups compared to using cluster analysis. This suggests that caution is required in the use of mean- or median-split methods in forming goal profile groups in that the

structure imposed may not reflect 'reality'. Perhaps using clustering techniques with goal orientations and perceived competence scores may provide more accurate group profiles in future research.

Consistent with previous research findings using goal profile analysis (Biddle et al., 1996; Fox et al., 1994; Roberts et al., 1996; Walling & Duda, 1995), Study 3 established that high task individuals, either alone or with high ego orientation, had adaptive motivational profiles compared to low task groups. Specifically, compared to the low task-oriented individuals, high task-oriented individuals had higher perceived competence, higher incremental beliefs, higher perceived autonomy, and lower amotivation. In addition, they also possessed higher perceived physical self-worth and were more actively involved in physical activity. Furthermore, it was found that the high task/high ego group was over represented by male students. On the other hand, students in the low task groups consisted more of girls than boys from the higher age group. This confirmed other findings from research into physical activity trends (Pratt et al., 1999). It is worth noting that although the high task/high ego cluster may be more physically active, and have higher perceived physical self-worth and competence compared to the high task/low ego cluster, the two clusters differed in perceived autonomy indicating that the high task/high ego individuals may not be fully intrinsically motivated in their behaviour.

The results of Study 3 have important implications for future research. First, it is important to note that motivation should not be characterised in simplistic terms, such as 'high' versus 'low'. Second, analysis of goal orientations alone may not give a clear picture of the motivational profiles of individuals because other motivational factors, such as perceived autonomy and perceived physical self-worth, exist within an individual in representing one's motivational profile. Finally, the identification of motivational profiles has important implications for practitioners in that intervention programmes can be designed to cater for specific 'at risk' groups in order to achieve a higher success rate in promoting physical activity among youth. This type of segmentation procedure using cluster analysis is very common and useful in marketing research to develop empirical groupings of customers, products, or objects (Punj & Stewart, 1983) and should be considered for future research in the physical



domains. Furthermore, researchers should examine multiple motivation determinants simultaneously rather than focusing on single factors, such as achievement goals, in the study of behaviour.

In summary, the results of the first three studies supported the general predictions of achievement goal theory in terms of motivated intentions, physical activity participation, and amotivation. Although dispositional goal orientations are important in explaining the variations in behaviour in an achievement context, it is even more important to consider the actual goal involvement state in this context. Nicholls (1989) posits that situational cues will affect the degree to which one goal or the other will be salient at any one time. Therefore, targeting situation-specific measures might provide better predictors of cognitive, affective and behavioural responses, and for interventions to take place by modifying the environmental cues or structure (Harwood et al., 2000). Study 5 was designed to examine the effects of goal involvement on intrinsic motivation.

In Chapter 2, it was reported that few studies utilising an achievement goal approach had examined the effects of goal involvement on intrinsic motivation experimentally (see Rawsthorne & Elliot, 1999). Intrinsic motivation is defined as engaging in an activity for its own sake (Deci & Ryan, 1985). Most achievement goal theorists argue that goal involvement should affect intrinsic motivation through the same processes that influence achievement behaviour (Harackiewicz & Elliot, 1993; Heyman & Dweck, 1992). Therefore, it is predicted that task involvement will promote intrinsic motivation by emphasising task mastery, persistence and challenge seeking (Dweck, 1986, 1999; Dweck & Leggett, 1988; Nicholls, 1989). Ego involvement will undermine intrinsic motivation by fostering concerns about evaluative processes and anxiety about performance (Dweck, 1986; Nicholls, 1989), particularly when perceived competence is low. When perceived competence is high, an ego-involved individual should maintain his/her intrinsic motivation in the activity (Elliot & Dweck, 1988; Nicholls, 1989).

Studies of goal involvement and intrinsic motivation yield a mixed pattern of results (see Chapter 2). For example, Butler (1992) found that ego involvement did

not undermine self-reported intrinsic interest, whereas Ryan et al. (1991) found a strong negative effect of ego involvement on intrinsic motivation (measured through self-reported enjoyment and free-choice behaviour). In Study 5, it was shown that goal involvement did not differentially affect intrinsic motivation under positive feedback, when the analysis compared mean scores of enjoyment and free-choice behaviour. The results showed that ego involvement and task involvement were effective in enhancing intrinsic motivation compared to the control group which received no goal involvement and competence feedback. If the analysis were restricted to this level, one would conclude that there were no differences between task and ego involvement on intrinsic motivation, and that both enhanced intrinsic motivation. However, when the correlations between enjoyment and free-choice behaviour are examined, it might show that the nature of the free-choice persistence of the ego-involved participants not be fully intrinsically motivated compared to the task-involved participants. Ryan et al. (1991) suggest that ego-involved participants may persist at the task during the free-choice period because of internal pressure (introjection) to perform well rather than the intrinsic interest and enjoyment of the task.

The findings in Study 5 have important methodological implications for researchers examining intrinsic motivation under positive feedback conditions. Deci and his colleagues (Deci et al., 1999) comment that with the use of self-reports of interest/enjoyment for the task, participants may report enjoyment because of the positive feedback given rather than interest in the task, resulting in an underestimation of the undermining effect on intrinsic motivation. On the other hand, the free-choice behavioural measure may also reflect the extrinsic motivation of the ego-involved participants rather than intrinsic motivation. This may inflate the free-choice measure of the ego-involved participants, leading again to an underestimation of the undermining effect. Ryan et al. (1991) argued that the most accurate way to ensure intrinsic motivation is correctly assessed is to measure both self-reported enjoyment and free-choice behaviour. Only when the correlation is high is intrinsic motivation evident. Very few studies have measured both variables and examined the correlations, and this could partly explain the mixed pattern of results among previous studies.

Overall, the findings of the studies in this thesis reinforce the claim that task mastery should be promoted in PE in order to foster intrinsic interest and long-term adaptive motivational patterns among pupils (Duda, 1996; Goudas & Biddle, 1994a, 1994b; Treasure & Roberts, 1995). In addition, important implications for researchers in examining goal profiles, and the effects of goal involvement on intrinsic motivation, have been highlighted.

## 8.5 Behavioural Regulations

Although many people have assumed that all forms of physical activity are intrinsically motivated, past research has shown that people may engage in physical activity for extrinsic reasons, such as social rewards or to avoid punishment (Ryan et al., 1984; Vallerand & Losier, 1999). Therefore, Deci and Ryan (1985, 1991) proposed Organismic Integration Theory (OIT) to specify different forms of extrinsic motivation and contextual factors and their effects on behavioural regulation (see Chapter 2). According to OIT, behaviour can be regulated differently, ranging from external regulation to fully self-determined, in which a process of internalisation may take place (Deci & Ryan, 1985, 1991). The more internalised a behavioural regulation, the more it will be experienced as autonomous (Ryan & Connell, 1989). It is assumed that people have a general regulatory style based on previous experiences and situational factors (Ryan, 1995; Ryan & Deci, 2000a, 2000b). Previous studies in the classroom and physical activity domains have found that more self-determined behavioural regulation results in more adaptive motivated behaviour (Chatzisarantis et al., 1997; Grolnick & Ryan, 1987; Ryan & Connell, 1989).

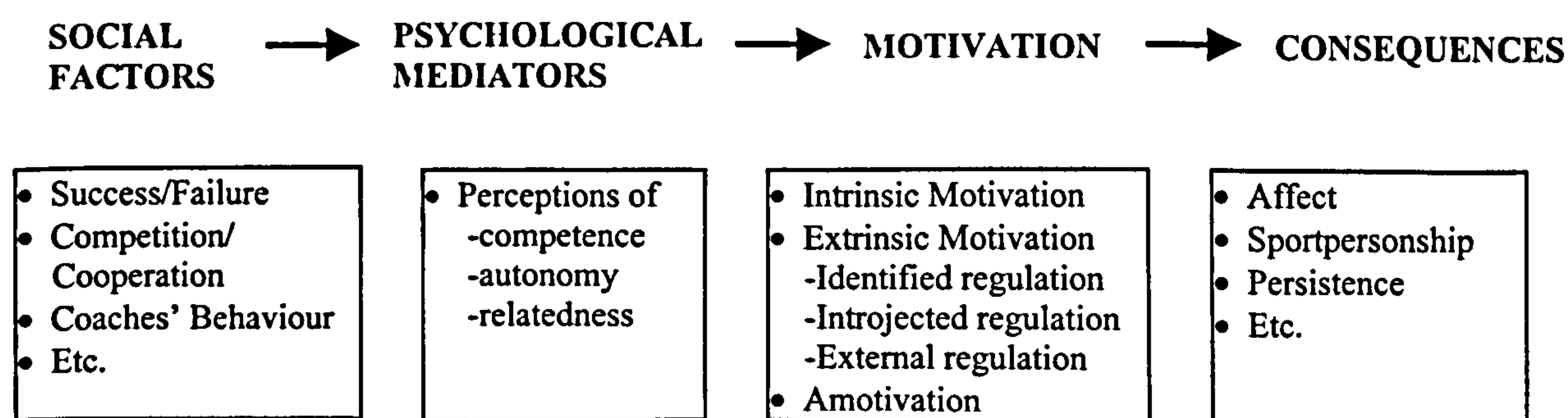
The results of Study 3 indeed concur with these previous findings. It was found that the more adaptive profiles consisted of individuals with high perceived autonomy, as indicated by the relative autonomy index (RAI), and low perception of amotivation. On the other hand, less adaptive profiles included students with low perceived autonomy and high amotivation. It appears that when students are more



self-determined or intrinsically motivated, they are more likely to adopt high incremental beliefs, high task orientation, high perceived competence and perceived physical self-worth and more likely to participate in physical activity. In contrast, the more their behaviour is externally regulated, the less likely they would be to adopt incremental beliefs and task orientation, and are less likely to perceive that they are physically competent, and are less likely to be involved in physical activity.

One point to note is that the design in Study 3 does not allow any causal inference as to whether behavioural regulation affects adoption of sport beliefs, perceived competence, perceived physical self-worth, or physical activity participation in any direction. Vallerand and Losier (1999) recently proposed a model based on self-determination theory (Deci & Ryan, 1985, 1991) and the Hierarchical Model of Intrinsic and Extrinsic Motivation (Vallerand, 1997) to integrate intrinsic and extrinsic motivation research in sport. This model may be useful to shed light on these relationships.

Specifically, Vallerand and Losier (1999) proposed a model comprising a motivational sequence: “Social Factors → Psychological Mediators → Types of Motivation → Consequences.” The model is shown in Figure 8.1.



**Figure 8.1.** The Proposed Motivational Sequence Involving Social Factors, Psychological Mediators, Motivation, and Consequences. (Adapted from Vallerand & Losier, 1999)

According to this model, Vallerand and Losier (1999) propose that social factors, such as success and failure, have a profound impact on individuals' thoughts,

feelings, and behaviours. Moreover, the effects of these social factors on motivation are mediated by perceptions of competence, autonomy, and relatedness (Blanchard & Vallerand, 1996a; Vallerand & Reid, 1984; Whitehead & Corbin, 1991). For example, focusing on competition (ego goals) tends to shift the focus away from the activity itself towards proving superiority, thus negatively affecting perceptions of autonomy, whereas focusing on cooperation (task goals) is likely to enhance intrinsic motivation. Similarly, providing positive feedback should enhance feelings of competence and increase intrinsic motivation. Failure feedback should generate feelings of incompetence and undermine intrinsic motivation. The resulting motivation, or behavioural regulation, can be viewed in terms of varying degrees of self-determination, ranging from intrinsic motivation to amotivation, leading to different cognitive, affective and behavioural consequences.

In the light of this model, it seems that social events, such as the perception of the PE context, teachers' behaviour, or classroom climate, have a tremendous influence on students' behavioural regulation and motivational outcomes. For example, if a PE teacher adopts a controlling style (low support in autonomy and relatedness) in delivering lessons and promotes an ego-involving atmosphere (low support in autonomy and increased pressure to perform), students, particularly those with low perceived competence, are likely to perceive themselves as being controlled, resulting in an external regulation and amotivation. If this happens over a period of time, these students will develop an externally regulated profile (indicated by low RAI and high amotivation). Consequently, they are unlikely to persist at the task or participate in physical activity outside of school because of unpleasant experiences in school PE, and this may result in low perceptions of their physical self-worth. Thus, it may be critical that teachers need to examine these social factors (their own behaviour and teaching methods), in terms of promoting autonomy, perceived competence and relatedness, in order to enhance students' motivation and positive motivational outcomes. One final point to mention is that the model proposed by Vallerand and Losier (1999) does not consider personal factors, such as conceptions of sport ability in the model. Future research should examine how personal factors interact with social factors in affecting the motivational sequence of the model.



## 8.6 Functional Significance of Achievement Goals

Research in achievement goal theory and self-determination theory has often assumed that ego involvement has an undermining effect on intrinsic motivation. According to achievement goal theorists, the reason for this is because when task-involved, attentional focus is on the task, and individuals participate in an activity for its own sake, thereby increasing intrinsic motivation on the task. Ego-involved individuals, however, focus their attention outside the task, rather than for the task itself, thereby leading to a decrease in intrinsic motivation (Nicholls, 1989). On the other hand, self-determination theory posits that when ego-involved, individuals are pressured to maintain their self-esteem or prove their competence, resulting in an external locus of causality which undermines intrinsic motivation (Deci & Ryan, 1987). However, the results of the first experiment in Study 5 showed that ego-involved participants increased their intrinsic motivation relative to the control group. The second experiment also replicated this finding in that there was no main effect for goal involvement on intrinsic motivation. This finding is contrary to previous research, where ego involvement has undermined intrinsic motivation (Plant & Ryan, 1985; Ryan, 1982; Ryan et al., 1991).

The reasons proposed for task involvement increasing intrinsic motivation (e.g., the focus of attention on the task itself) and for ego involvement undermining intrinsic motivation (e.g., the focus is away from the task) may not be adequate in explaining the effects of ego involvement on intrinsic motivation. The results of Study 5 showed that even when attention was directed away from the task, indices of intrinsic motivation increased (see also Deci et al., 1999). It is possible that Ryan and colleagues' studies (Plant & Ryan, 1985; Ryan, 1982; Ryan et al., 1991) differ from the present study in the conceptualisation of ego involvement in terms of either self-esteem contingency or normative evaluation. In Ryan and colleagues' studies, ego involvement was conceptualised as self-esteem contingency (performance is a reflection of creative intelligence) as opposed to the normative evaluation and social comparison used in the present study. Rawsthorne and Elliot (1999) suggest that ego



involvement induced through self-esteem contingencies can create greater undermining effects on intrinsic motivation because of evaluative pressure and anxiety compared to normative evaluation. However, the moderator analysis in the meta-analysis of Rawsthorne and Elliot (1999) found no evidence to suggest that studies using the two different methods of ego induction produce different effects.

One possible explanation for the positive effect of ego involvement on intrinsic motivation is due to the functional significance (psychological meaning) of ego goals. Self-determination theory stresses that for any event, either contextual factors or personal factors can be perceived as having two aspects (Deci & Ryan, 1987). A controlling aspect, termed controlling functional significance, refers to perceptions or processes signifying that stimuli frustrate psychological needs. In addition, an informational or autonomous aspect, termed autonomous functional significance, refers to perceptions or processes signifying that stimuli support psychological needs. Depending on how the environment communicates the stimuli (autonomy-supportive versus controlling), the stimuli can be interpreted as autonomous or controlling. Therefore, ego involvement may be self-determined and willingly pursued (Deci & Ryan, 1987). The results of Study 5 showed that task and ego involvement increased indices of intrinsic motivation, relative to the control group, thus it can be claimed that task and ego involvement can have an autonomous functional significance. However, the design of Study 5 did not permit the conclusion that task and ego involvement can have a controlling aspect because a controlling type of communication was not present. Further discussion on this will be developed in the next section.

## **8.7 The Role of an Autonomy-Supportive Style**

According to Cognitive Evaluation Theory (CET) and the model proposed by Vallerand and Losier (1999), significant others' behaviour can also impact upon the intrinsic motivation of individuals' through their behaviour. For example, teachers can interact with students in a controlling manner such that students feel pressured to

think or act in particular ways, or an autonomy-supportive style such that students are encouraged to make their own choices (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000a, 2000b). These interpersonal contexts have a direct impact on students' motivation because they are likely to influence the students' perceptions of autonomy, perceived competence and relatedness (Deci, Vallerand, Pelletier, & Ryan, 1991; Vallerand & Losier, 1999)

Previous studies have shown that autonomy-supportive teachers enhance students' intrinsic motivation, curiosity, and challenge-seeking behaviour compared to teachers with controlling styles (Deci et al., 1981a, 1981b, 1994; Goudas et al., 1995). This is because contextual events play an important role in supporting or inhibiting the internalisation process. For example, autonomy-supportive teachers may facilitate students' motivational orientation towards being "origins" of their behaviour, that is, being active and having an internal locus of causality, rather than "pawns" being passive and having an external locus of causality. Deci et al. (1994) showed that social context can support self-determination or promote internalisation through providing a rationale, acknowledgement, and choice (see Chapter 2). These three facilitating factors promote autonomy and relatedness, and minimise pressure to act in a particular way.

The results of Study 5 showed that autonomy-supportive communication enhanced participants' intrinsic motivation on the task, regardless of their goal involvement, relative to controlling communication. No previous study has paired goal involvement with interpersonal communication style in examining intrinsic motivation. This preliminary investigation shows that interpersonal contexts may be more important than goal involvement in influencing intrinsic motivation.

The functional significance of goals may shed light on the mechanisms linking goal involvement and intrinsic motivation. From the findings of Study 5, ego involvement is perceived as having an external locus of causality (controlling functional significance) where individuals are pressured to act in a particular way. An autonomy-supportive context may be able to minimise this internally controlling behaviour regulation and facilitate internalisation towards more autonomous



behaviour (internal locus of causality). This internalisation process causes the actors to initiate and regulate their behaviour in a more self-determined way (they want to rather than they have to) thereby increasing their intrinsic motivation. If that is the case, there should be a positive relation between ego involvement and indices of intrinsic motivation under autonomy-supportive conditions. Indeed, the correlations in Study 5 showed a moderate positive association between ego involvement and indices of intrinsic motivation under autonomy-supportive conditions. In addition, the path analysis in Study 5 simultaneously examined which variables predicted indices of intrinsic motivation. It was found that the positive effect on intrinsic motivation under ego involvement was due to perceived autonomy and not ego involvement itself. Furthermore, the model showed that task goals (involvement) tend to be resistant to the undermining effects of controlling communication. This was justified in the path analysis in that task directly predicted intrinsic motivation under controlling contexts.

Self-determination theory suggests that it is important to consider the perception of the environmental events and not the event itself (e.g., rewards, goals) in determining intrinsic motivation (Deci & Ryan, 1987). The findings in Study 5 clearly support the assumptions of self-determination theory in that perceived environmental events can facilitate intrinsic motivation by supporting the needs for autonomy, competence and relatedness (Ryan & Deci, 2000a, 2000b).

The perceived climates of social contexts have been the focus of achievement goals theorists as well (Ames, 1984, 1992a, 1992b; Duda, 1993; Newton & Duda, 1999; Dweck & Leggett, 1988; Kavussanu & Roberts, 1996; Papaioannou, 1997; Seifriz et al., 1992; L. Williams, 1998). Within this perspective, the main focus has been on the influence of perceived task- and ego-involving motivational climates in impacting on subsequent motivational patterns (Ames, 1992a, 1992b). A task-involving (mastery) motivational climate is an environment where learning, improvement and effort are valued and emphasised, whereas an ego-involving (performance) motivational climate is one that is perceived as focusing on social comparison or normative feedback. In general, previous research has established that a perceived mastery climate is important for adaptive motivational patterns, and perceived performance climate is associated with less adaptive outcomes (see Chapter



2). Some researchers even suggest restructuring the environment such that a mastery motivational climate is promoted (Ames, 1992a, 1992b; Treasure & Roberts 1995). A recent study by Brunel (1999) examined the relationship of perceived motivational climate and goal orientation to indices of intrinsic, extrinsic motivation, and amotivation. One significant finding of this study was that perceived mastery climate was linked to introjected regulation. This highlights that even when a mastery climate is in place, the behaviour of the students may still not be self-determined. For example, a teacher who creates a mastery climate can be communicating to the students in a controlling style, where students feel that they are being controlled by the teacher, and perceive that they are coerced into learning and improving on the task. The results of Study 5 showed that perceived autonomy in the environment, that is, one that offers a rationale for engaging in an activity, acknowledges individuals' conflicts, and provides true choice, may be the key to enhancement of intrinsic motivation rather than creating a mastery climate alone. Future research is warranted in examining the effects of perceived motivational climate and perceived autonomy on motivational patterns.

In summary, the results of Study 5 suggest that, like any other events, task and ego involvement can be perceived as autonomous or controlling. As a consequence, task and ego goals can have undermining or enhancing effects on intrinsic motivation. The relationship between goals and intrinsic motivation appears to be more complicated than previous research has shown. Although this present investigation cannot show exactly what the functional significance of task and ego involvement is, it can state that the functional significance of goals can be both autonomous and controlling depending on how they are communicated. It is shown that an autonomy-supportive context can enhance intrinsic motivation compared to a controlling context, regardless of goal involvement. These findings suggest that in order to promote behaviour change or enhance motivation, promoting autonomy may be more effective than structural change of the environment per se.

## **8.8 Limitations and Recommendations for Future Research**

There are a few potential methodological and conceptual limitations in the present studies that need to be mentioned to guide future research. In addition, recommendations for future research are provided in order to advance our knowledge of achievement motivation in the physical domain.

### **Methodological Limitations**

In all the studies, most of the constructs under study were examined through self-report. This has limitations. For example, younger children may not be able to make accurate self-reports due to their level of cognitive maturation. In addition, they may respond to the questionnaire in a socially desirable way, especially with regards to task goals, incremental beliefs or perceived competence because of their appealing nature. Although students have been assured of confidentiality of their responses, they were told that the only person who would see their responses would be the researcher. In addition, they were informed that the aim of the questionnaire was to obtain their opinions and there were no 'correct' answer. The steps taken would have reduced the tendency for social desirability but it might not have eradicated it.

In the experimental studies, only a few items from each sub-scale were used as indicators of a particular construct. This was because of the constraints of time in the school setting. One could argue that using only a few items may not be adequate in representing the construct of interest. Future studies need to take this into account and try to incorporate the full questionnaire, if possible, or validate shorter scales. In addition to using self-report measures, future studies may use in-depth interviews and observations to gain further insight into students' motivation. These methods can also serve to check the accuracy of the questionnaire responses.

Regarding specific measures, further psychometric work is required concerning the assessment of perceived competence, amotivation, physical activity participation and goal involvement states. First, it was highlighted that the perceived competence sub-scale of the Physical Self-Perception Profile (Fox & Corbin, 1989)



may not allow differentiation between self-referenced competence and normative-referenced competence. Future research is warranted in the development of a measurement tool that assesses the two distinct ways of conceiving competence (task or ego conception of competence) to allow testing of the antecedents and consequences of perceived competence in a more valid way. Second, the measurement of amotivation in Study 2 contained one item that had high positive kurtosis. Subsequently, this item was deleted from further analyses. Use of the remaining two items might be problematic in terms of reliability and validity. Further work needs to be done on assessing amotivation. Third, the measure of physical activity participation in Study 3 contained only one item. This may be seen as simplistic and crude and may not be a true reflection of the level or 'quality' of physical activity participation. For example, some students may participate in recreational sport but be more active compared to those at the competitive level in terms of frequency and intensity. A more accurate measure of physical activity participation is required for future studies. Welk, Corbin and Dale (2000) suggest previous-day activity recall questionnaires and The Physical Activity Questionnaire for Children (Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997) to be most suitable for measuring children's physical activity, among self-report instruments. Finally, there is no established measure of goal involvement states apart from the single-item measures of situation task and ego involvement designed by Swain and Harwood (1996) and Harwood and Swain (1996). The alternative method used in Study 5 was to change the stem of the POSQ to serve as manipulation checks for goal involvement states. This has been used in previous studies (Hall & Kerr, 1997; L. Williams, 1998). However, Duda and Whitehead (1998) suggest that this may not be appropriate because they proposed that goal states might be more dynamic "rather than simply a manifestation of those dispositions at one moment of time" (p. 42). The development of a state goals measurement tool is desirable for future studies.

Another measurement issue concerns the assessment of attributions. The items asked participants whether their failure on the task was due to effort or ability. This mode of measurement failed to capture the three different dimensions proposed by Weiner (1979) in terms of locus of causality, stability and controllability. In addition, participants may attribute their performance to other factors, such as luck or to the



equipment used. Future studies should consider using more open-ended questions in measuring attributions and include the three dimensions of attributions as proposed by Weiner's theory.

Studies 4 and 5 only examined the impact of sport ability beliefs and goals in one sport task (golf-putting). It should be acknowledged that there might be different motives associated with different types of physical activities or sports (Frederick & Ryan, 1993). In addition, previous research has found that motivation in PE is specific to certain activities (Goudas et al., 1994b). Therefore, the extent to which the findings can be generalised to other sports and physical activities is not known. Extending this research into other activities may be fruitful to determine the boundary conditions of these findings.

One other potential limitation is that no performance measure was used in Study 5. It is not known whether being task-involved or ego-involved produces better skill improvement or performance. Similarly, it is not known whether an autonomy-supportive context produces more effective skill improvement or performance outcomes relative to the controlling communication. Future studies should assess skill acquisition and performance as dependent variables.

The method used in the measurement of free-choice behaviour could be improved in future research. The procedure used in Study 5 required an experimenter to observe participants outside the room through a glass panel. This is not an ideal way of measuring free-choice behaviour because there may be error in recording the time as the experimenter needed to ensure he/she could not be seen by the participants. Future studies should consider using a one-way mirror or hidden camera to measure free-choice behaviour to obtain a more accurate measure of free-choice engagement. Finally, the free-choice behaviour is indicated by the total time engaged in the golf-putting task during the free-choice period. However, this does not allow differentiation in terms of the quality of behaviour. Some participants engaged in the task immediately when given the choice, but some participants looked through the magazines and returned to the task. Some even alternated from one activity to the

other. Future studies should attempt to differentiate the free-choice behaviour in terms of intrinsically or extrinsically motivated behaviour.

Future research should continue to validate the CNAAQ-2. Given that no measure is perfect, the lower internal reliability of the Stable and Learning sub-scales indicated that there is potential for further improving the measure. The wording of the items could be refined, and more items could be added to each sub-scale in future studies. It appears that the incremental scale of the CNAAQ-2 has the same negatively skewed responses as the task sub-scales of the TEOSQ and POSQ, such that the mean scores are around '4' on a 5-point Likert scale. Future research needs to examine whether this is due to the appealing nature of the items or a true reflection of a person's belief. In addition, cross-cultural validity of the CNAAQ-2 should be determined in future research for comparative studies, or testing theories cross-culturally. Since culture may shape people's beliefs and self-perceptions, there is a need to examine the way sport ability beliefs may be conceptualised in different societies. Finally, the CNAAQ-2 should be administered to other populations (e.g., elite athletes, recreational participants, community-based exercise participants) to test the generalisability of the current results.

### **Conceptual Limitations**

Studies 1 to 4 in this thesis examined the relationship between conceptions of the nature of sport ability and goals. Based on the theory proposed by Dweck and her colleagues (Dweck, 1986, 1999; Dweck & Leggett, 1988), it is assumed that sport ability beliefs predict goals. However, the causal influence of goal orientation on sport ability beliefs was not tested. Future research needs to examine whether there is any reciprocal influence between sport ability beliefs and goals. Also, there were some indications (Study 1) that incremental theorists may choose ego goals. It is possible that individuals who believe that they could improve choose to compete with others to show superiority. Future work on this aspect is needed. In addition, future studies need to examine the antecedents of sport ability beliefs. Could sport ability beliefs be developed due to socialisation or childhood experiences? Could the beliefs be developed due to parents', teachers' or media influence? Understanding the roots of



these beliefs is important for researchers as well as practitioners in terms of gaining insight into motivational determinants and also for planning effective interventions.

All the studies in this thesis focused on task (mastery) and ego (performance) goals. This could be seen as narrow in scope because ego goals can be further differentiated into approach versus avoidance dimensions as suggested by some researchers (Elliot & Harackiewicz, 1996; Pintrich, 2000; Rawsthorne & Elliot, 1999; Skaalvik, 1997). Pintrich (2000) suggests that mastery goals may also be differentiated in these two ways. There could be individuals who adopt mastery or performance goals in an avoidance sense such that they just want to avoid not learning the task or to avoid being last in a competition. Future research should examine these goals in terms of the approach versus avoidance distinction in order to gain a better understanding of motivated behaviour.

In Studies 4 and 5, the experimental manipulations of sport ability beliefs and goal involvement may have been successful in creating temporary patterns of beliefs or goals, and subsequently, produced different cognitive and behavioural outcomes. However, the long term impact of such beliefs and goal involvement manipulations is unknown. Future studies should examine the effects of beliefs and goals over varying periods of time.

The findings of Studies 4 and 5 also suggest that the experimental conditions created may not be powerful enough to influence the affective outcomes of the participants. This indicates that future studies should aim to create more realistic test situations, such that situations are seen as highly evaluative, with interpersonal comparison and increased public awareness. In addition, the experiments used a relatively novel task that was administered individually. There is a possibility that participants may respond differently in group situations. Such potential limitations should be thoroughly explored in future research. Ideally, field studies in realistic PE settings should be conducted.

Motivation is seen as a multidimensional phenomenon (Deci & Ryan, 1985, Ryan & Deci, 2000a, 2000b). The use of a free-choice paradigm may be seen as



simplistic and not reflecting extrinsic motivation. Future studies need to take this into account and identify the different motivations relating to behaviour. Using qualitative methods may provide further insight into the reasons for participation during the free-choice period.

According to self-determination theory, it is the changes in perceived locus of causality and perceived competence that influence intrinsic motivation, rather than the measurement taken at one point in time. Although the results of the present investigation are consistent with the proposed theory, it may be necessary for longitudinal studies to be carried out to confirm the causal interpretation more convincingly.

### **Further Research Directions**

Achievement goal theory states that whether a person is task-involved or ego-involved in a particular situation is a function of the perceived situational factors or climate, and the individual's dispositional goal orientation (Nicholls, 1989; Dweck & Leggett, 1988). Previous studies have shown that perceived motivational climate may be a better predictor of motivation than dispositional goal orientation (Cury et al., 1996; Dorobantu & Biddle, 1997). Taking all the evidence together, the findings of this thesis show that the perceived environment plays an important role in affecting the motivation of students. It is recommended that future research should examine perceived motivational climate alongside perceived autonomy to ascertain the impact on motivation. Likewise, examining perceived climate with sport ability beliefs is also an interesting area of future research.

If perceived autonomy is more important than goal involvement in influencing intrinsic motivation, as shown in Study 5, future work should focus on the antecedents of perceived autonomy. It is assumed that individuals' past experiences will determine their sense of autonomy (Deci et al., 1991). However, very few studies have provided evidence for this. On the other hand, it is also important to find out what causes teachers or coaches to be autonomy-supportive or controlling in delivering their lessons, or dealing with their students or athletes. To date, researchers have confirmed

that dispositional influences, situational pressures (Reeve, Bolt, & Cai, 1999), and exposure to autonomy-supportive or controlling models (G. Williams & Deci, 1996), affect a teacher's motivating style. More studies should be conducted to examine teachers' motivating style and its influence on students' motivation and behaviour.

Finally, Study 5 focused on the effect of goal involvement and interpersonal communication on intrinsic motivation under positive feedback conditions. This in itself is not complete because the same mechanism may operate differently under failure conditions. To gain a more complete understanding of the impact of goal involvement and communication style on intrinsic motivation, it is necessary for future research to examine situations where failure feedback is given.

## **8.9 Practical Implications**

Although many of the potential limitations of the studies have been highlighted, and many more questions remain unanswered, the results of the present research are still relevant for the practice of PE.

The present studies have shown that incremental beliefs lead to the adoption of learning (task) goals and that entity beliefs lead to the adoption of performance (ego) goals. This is consistent with previous research (Biddle et al., 1999a; Dweck, 1999; Dweck & Leggett, 1988; Lintunen et al., 1999; Sarrazin et al., 1996). This implies that teachers should not label students as talented or gifted in terms of describing their sport ability. This kind of labelling may cause the child to be overly concerned with justifying the label attached to them and less concerned with meeting challenges that could enhance his/her skills. In addition, these children may react in a maladaptive way when faced with setbacks because they worry about making mistakes, as this would show low ability and not deserve to be labelled as talented or gifted. Furthermore, fostering an entity belief may lead to amotivation and ego orientation and should be avoided.



The findings of the present studies may also guide strategies for planning intervention programmes. For example, rather than just intervene at the level of achievement goals, teachers may cultivate incremental beliefs among students, especially in the early stages of learning, to result in a more adaptive pattern. Through the reinforcement that ability is dynamic and can be improved through effort and practice, students, particularly those who have lower perceived competence, will be more satisfied with their involvement, and feel less anxious in PE classes if they support incremental beliefs. Even those who are more able may strive to learn and do even better in the future. Guiding students to develop incremental beliefs will help them to cope more effectively with failure and setbacks, which are unavoidable in the sport and physical activity domains. The present studies also showed that verbal persuasion could be successful in making a particular belief system salient and to operate in a particular situation, at least temporarily. Although its long term impact was not examined, classroom research has shown that these beliefs can be cultivated in real-life interventions (Aronson, 1998; Aronson & Fried, 1998).

Encouraging mastery goals through incremental beliefs results in adaptive motivation patterns. However, the present studies and previous research have showed that performance goals may not necessarily be negative, as long as they are coupled with high mastery goals (Dorobantu & Biddle, 1997; Fox et al., 1994; Ommundsen & Roberts, 1999). Therefore, the focus of an intervention should be to enhance the adoption of mastery goals, and not on avoiding the adoption of performance goals. For example, PE lessons do not have to exclude or minimise competition or social comparison (grading) if teachers emphasise the importance of personal improvement at the same time and the self-enhancing function of aspects of competition and assessment. In order to promote mastery goals, the six T-A-R-G-E-T areas provide excellent guidelines for emphasising the importance of personal improvement (Ames, 1992a, 1992b; Treasure & Roberts, 1995).

In addition to sport ability beliefs and achievement goals, perceived autonomy and teachers' communication style are key areas for interventions. The results of the present studies show that when students possess high perceived autonomy in their PE classes, they are more likely to have adaptive motivation outcomes, such as high



perceived competence and high levels of physical activity participation outside of school. If physical activity participation is to be encouraged, teachers should encourage students to make their own decisions rather than force them into doing physical activity. Deci and Flaste (1995) suggest that the role of teachers, parents, or coaches should be to create conditions such that children are able to make their own decisions so that they act as the “origins” rather than “pawns” of their behaviour. Generally, PE in schools is part of the compulsory programme of the curriculum, thus all students have to participate. Hence, it is very important to create a PE environment in which students can experience themselves as initiators of their own behaviour. In order to be successful in creating an autonomy-supportive context, teachers need to provide a rationale for doing the activities, acknowledgement of potential conflict, and choice to facilitate the process of internalisation.

Providing students with a rationale that is meaningful to them will help them to understand the usefulness and benefits of doing the activities. This may help them to value the activities, and assist in a more self-determined behavioural regulation. However, even when a meaningful rationale is provided, some students may still feel under pressure to engage in the activities because of internal conflict (i.e., they don't really want to do it). Thus, acknowledging the internal conflict of the students may convey relatedness through empathy and respect for the students as individuals. Furthermore, any possible internal or external pressure can be minimised through providing real choice. Providing choice allows students to feel a sense of autonomy, control, and empowerment over their own behaviour.

One point to note is that although this research is located within a physical education context and makes specific recommendations for physical education, it does not engage with the extensive literature in physical education/pedagogy that links closely with some of the findings. Nonetheless, the findings suggest that it is important for teachers to examine their teaching and communication styles when delivering their lessons. The use of less direct teaching styles and more student-centred approaches will promote feelings of autonomy in students (Mandigo & Holt, 2000). For example, the “Teaching Games for Understanding” approach (Bunker & Thorpe, 1983; Werner, Thorpe & Bunker, 1996) may be appropriate because the

focus is to enhance students' independence in decision-making and promote understanding of the game. Using this approach, feelings of autonomy, relatedness and competence may be fostered. On the other hand, the use of more direct teaching styles, such as command or authoritarian styles, is more likely to be perceived as controlling, thus undermining the internalisation process. Teachers are advised to avoid use of words like "should", "have to", "must", and "ought" when presenting the task to the students, as these words are more likely to be perceived as controlling.

In summary, if the aim of educators is to promote intrinsic goals and interest towards physical activity among students, the findings of the present studies have provided important practical implications for PE in schools.

## **8.10 Conclusions**

The present investigation provides a viable measuring instrument for assessing sport ability beliefs, and provides an insightful understanding of the conceptually coherent relationships between sport ability beliefs, achievement goals, intrinsic motivation, and other motivational processes. This research has demonstrated the potential of integrating different motivational theories to advance the explanation of human behaviour from a social cognitive perspective. In addition, it has shown that psychological research in PE is valuable in providing insight into students' experiences towards physical activity, and these findings can help physical educators and administrators in designing PE programmes that will enhance students' motivation towards physical activity and increase the chances of adopting an active lifestyle. Finally, it is hoped that more research will be conducted in PE to further our understanding of motivated behaviour in this domain.



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## Appendix 1

### The interview guide: Conceptions of sport ability

- Introduction
- Purpose
- Confidentiality
- Permission to record
- Reason for selection

1. I am interested in knowing what you think about sport ability. Think about your sport experience, how would you describe your sport ability? (Basketball/Other sport)

How do you feel ...?

What are you doing about that ...?

In what ways do you think you can ...?

How might this affect you?

Please tell me more about it...

I appreciate your comments. The information you have given is very useful. Thanks.

#### About Interviewee

School: \_\_\_\_\_

Name: \_\_\_\_\_

Age: \_\_\_\_\_

Gender: Male/ Female

Sport: \_\_\_\_\_

Year of Experience: \_\_\_\_\_

Level: \_\_\_\_\_

How many hours each week do you spend playing sport?

\_\_\_\_\_

## Appendix 2

### Content Analysis: What are your views on sport ability?

We are interested in how people think about sport and the ability people have in sport. Read each of the following six ways that could be used to view sport ability:

- A) **Gift**: this is when sport ability is seen to be the result of inherited attributes; in other words, it is something you are born with.
- B) **Stable**: this is when sport ability is seen to be fixed and not likely to change much.
- C) **General**: this is when sport ability is seen as being general across all sports, i.e., if you are good at one sport, you are also good at other sports.
- D) **Learning**: this is where sport ability is seen to be achieved through learning and practice.
- E) **Incremental**: this is where sport ability is seen to develop in stages.
- F) **Specific**: this is where sport ability is seen as specific to one sport; in other words if you are good at one sport you may not necessarily be good at others.

Please classify the following statements into the given categories. Check the definitions above if you need to. We are interested in your opinions. There are no right or wrong answers. Please mark with a circle on each line, which represents the category. You are allowed to circle more than one category in each statement.

- |   |      |        |         |          |             |          |      |
|---|------|--------|---------|----------|-------------|----------|------|
| 1. We have a certain level of ability in sport and we cannot really do much to change that level.   | Gift | Stable | General | Learning | Incremental | Specific | None |
| 2. To be successful in sport you need to have a natural aptitude, to be born with it.   | Gift | Stable | General | Learning | Incremental | Specific | None |
| 3. To be successful in sport you need to learn techniques and skills, and practice them regularly.  | Gift | Stable | General | Learning | Incremental | Specific | None |
| 4. If you are good at sport, you are good at all sports, even if they are very different (e.g. athletics, gymnastics, team games, swimming, tennis and climbing). | Gift | Stable | General | Learning | Incremental | Specific | None |
| 5. Even if you try, the level you reach in sport will change very little.   | Gift | Stable | General | Learning | Incremental | Specific | None |
| 6. The same person can be good at one sport but not good in other sports.   | Gift | Stable | General | Learning | Incremental | Specific | None |
| 7. You need to have a certain “gifts” to be good at sports.   | Gift | Stable | General | Learning | Incremental | Specific | None |



- |   |  |
|---|--|
| 8. You need to learn and to work hard to be good at sport.  | Gift Stable General Learning Incremental Specific None |
| 9. In sports, if you work hard at it, you <u>will</u> always get better.  | Gift Stable General Learning Incremental Specific None |
| 10. In principle, if you are good at one sport, you are good at almost all sports (even if they are quite different). | Gift Stable General Learning Incremental Specific None |
| 11. How good you are at sport is something which you can improve only with difficulty.                                | Gift Stable General Learning Incremental Specific None |
| 12. To be good at sports, you need to be born with the basic qualities which allow you success.                       | Gift Stable General Learning Incremental Specific None |
| 13. To reach a high level of performance in sport, you must go through periods of learning and training.              | Gift Stable General Learning Incremental Specific None |
| 14. It is not unusual for someone who is good at one sport to experience difficulties in other sports.                | Gift Stable General Learning Incremental Specific None |
| 15. How good you are at sports will <u>always</u> improve if you work at it.  | Gift Stable General Learning Incremental Specific None |
| 16. Someone who is good at sport succeeds in any sport.   | Gift Stable General Learning Incremental Specific None |
| 17. It is difficult to change how good you are at sport.  | Gift Stable General Learning Incremental Specific None |
| 18. To be good at sport you need to be naturally gifted.  | Gift Stable General Learning Incremental Specific None |
| 19. You can be very good at one sport and have problems with other sports.  | Gift Stable General Learning Incremental Specific None |
| 20. If you put enough effort into it, you will <u>always</u> get better at sport.                                     | Gift Stable General Learning Incremental Specific None |
| 21. It's by learning and by hard work that you can succeed and be good at sport.                                      | Gift Stable General Learning Incremental Specific None |

## Appendix 3

### Study 1 Questionnaire

#### SECTION A

1. School/College: \_\_\_\_\_
2. Year of Study: Year 8 / 9 / 10 / 11
3. Age: \_\_\_\_\_ years \_\_\_\_\_ months
4. Gender: Male / Female

Please tick one box:

5. Do you intend to play sport or exercise (which will make you out of breath) three times a week for the next two weeks?

Very Likely!  
Likely  
Not Sure  
Unlikely  
Very Unlikely!


6. Not including school PE lessons, how often do you play sport (this is training and competing)?

Hardly ever or not at all  
1-2 times per week  
More than 2 times per week


7. How would you describe your sport participation?

Don't play very much  
Recreational Level  
Competitive Level


8. Approximately how many hours each week do you spend playing sport?

Less than 1 hour  
Between 1-3 hours  
More than 3 but less than 6 hours  
More than 6 hours


9. Do you plan to play sport or exercise (which will make you out of breath) three times a week for the next two weeks?

- YES!
- Yes
- Not Sure
- No
- NO!


**SECTION B: When do you feel successful in sport/PE?**

Read each sentence carefully and decide to what extent you agree with it. Indicate how you feel most of the time by circling one number for each statement.

**I feel most successful in sport/PE when .....**

Strongly Disagree	Strongly Agree
-------------------	----------------

1.	I learn a new skill and it makes me want to practice more.	1	2	3	4	5
2.	I am the only one who can do the play or skill.	1	2	3	4	5
3.	I learn something that is fun to do.	1	2	3	4	5
4.	I can do better than my friends.	1	2	3	4	5
5.	I learn a new skill by trying hard.	1	2	3	4	5
6.	the others can't do as well as me.	1	2	3	4	5
7.	I work really hard.	1	2	3	4	5
8.	others mess-up and I don't.	1	2	3	4	5
9.	something I learn makes me want to go and practice more.	1	2	3	4	5
10.	I score the most points or goals.	1	2	3	4	5
11.	a skill I learn really feels right.	1	2	3	4	5
12.	I am the best.	1	2	3	4	5
13.	I do my very best.	1	2	3	4	5



### **SECTION C: What are your views on sport ability?**

Please answer each question below. We are interested in your opinions. There are no right or wrong answers. Please circle one number for each question which best represents your opinions.

	Strongly Disagree				Strongly Agree
1. We have a certain level of ability in sport and we cannot really do much to change that level.	1	2	3	4	5
2. To be successful in sport you need to have a natural aptitude, to be born with it.	1	2	3	4	5
3. To be successful in sport you need to learn techniques and skills, and practice them regularly.	1	2	3	4	5
4. If you are good at sport, you are good at all sports, even if they are very different (e.g. athletics, gymnastics, team games, swimming, tennis and climbing).	1	2	3	4	5
5. Even if you try, the level you reach in sport will change very little.	1	2	3	4	5
6. The same person can be good at one sport but not good in other sports.	1	2	3	4	5
7. You need to have a certain "gifts" to be good at sports.	1	2	3	4	5
8. You need to learn and to work hard to be good at sport.	1	2	3	4	5
9. In sports, if you work hard at it, you <u>will</u> <u>always</u> get better.	1	2	3	4	5
10. In principle, if you are good at one sport, you are good at almost all sports (even if they are quite different).	1	2	3	4	5
11. How good you are at sport is something which you can improve only with difficulty.	1	2	3	4	5
12. To be good at sports, you need to be born with the basic qualities which allow you success.	1	2	3	4	5

	Strongly Disagree				Strongly Agree
13. To reach a high level of performance in sport, you must go through periods of learning and training.	1	2	3	4	5
14. It is not unusual for someone who is good at one sport to experience difficulties in other sports.	1	2	3	4	5
15. How good you are at sports will <u>always</u> improve if you work at it.	1	2	3	4	5
16. Someone who is good at sport succeeds in any sport.	1	2	3	4	5
17. It is difficult to change how good you are at sport.	1	2	3	4	5
18. To be good at sport you need to be naturally gifted.	1	2	3	4	5
19. You can be very good at one sport and have problems with other sports.	1	2	3	4	5
20. If you put enough effort into it, you will <u>always</u> get better at sport.	1	2	3	4	5
21. It's by learning and by hard work that you can succeed and be good at sport.	1	2	3	4	5

**SECTION D: What I am like?**

Please indicate by circling a number how much these statements are, or are not, like you.

	This is Not at all Like me					This is Very much Like me
1. Some people feel that they are good when it comes to playing sport.	1	2	3	4	5	
2. Some people feel that they are among the best when it comes to sport or athletic ability.	1	2	3	4	5	
3. Some people are quite confident when it comes to taking part in sports activities.	1	2	3	4	5	
4. Some people feel that they are one of the best when it comes to joining in sport activities.	1	2	3	4	5	
5. Some people are sometimes a little slower than most when it comes to learning new sport skills.	1	2	3	4	5	
6. Given the chance, some people are one of the first to join in sport activities.	1	2	3	4	5	

Please check that you have given an answer for every question.  
Thank you for helping out in the survey.



## Appendix 4

### Studies 2 and 3 Questionnaire

#### SECTION A

1. School/College: \_\_\_\_\_
2. Year of Study: Year 7 / 8 / 9
3. Age: \_\_\_\_\_ years \_\_\_\_\_ months
4. Gender: Male / Female
5. Father's current occupation \_\_\_\_\_
6. Mother's current occupation \_\_\_\_\_
7. Your postcode at home \_\_\_\_\_
8. How would you describe your sport participation?  
Don't play very much   
Recreational Level   
Competitive Level

**SECTION B: When do you feel successful in sport/PE?**

Read each sentence carefully and decide to what extent you agree with it. Indicate how you feel most of the time by circling one number for each statement.

**I feel most successful in sport/PE when .....**

Strongly Disagree					Strongly Agree
----------------------	--	--	--	--	-------------------

- |     |  |   |   |   |   |   |
|-----|--|---|---|---|---|---|
| 1.  | I learn a new skill and it makes me want to practice more. | 1 | 2 | 3 | 4 | 5 |
| 2.  | I am the only one who can do the play or skill.            | 1 | 2 | 3 | 4 | 5 |
| 3.  | I learn something that is fun to do.                       | 1 | 2 | 3 | 4 | 5 |
| 4.  | I can do better than my friends.                           | 1 | 2 | 3 | 4 | 5 |
| 5.  | I learn a new skill by trying hard.                        | 1 | 2 | 3 | 4 | 5 |
| 6.  | the others can't do as well as me.                         | 1 | 2 | 3 | 4 | 5 |
| 7.  | I work really hard.  | 1 | 2 | 3 | 4 | 5 |
| 8.  | others mess-up and I don't.                                | 1 | 2 | 3 | 4 | 5 |
| 9.  | something I learn makes me want to go and practice more.   | 1 | 2 | 3 | 4 | 5 |
| 10. | I score the most points or goals.                          | 1 | 2 | 3 | 4 | 5 |
| 11. | a skill I learn really feels right.                        | 1 | 2 | 3 | 4 | 5 |
| 12. | I am the best.   | 1 | 2 | 3 | 4 | 5 |
| 13. | I do my very best.   | 1 | 2 | 3 | 4 | 5 |

**SECTION C: Why do you take part in sport/PE?****I take part in sport/PE .....**

		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center; padding: 5px;">Strongly Disagree</td> <td style="width: 50%; text-align: center; padding: 5px;">Strongly Agree</td> </tr> </table>					Strongly Disagree	Strongly Agree
Strongly Disagree	Strongly Agree							
1.	because I'll get into trouble if I don't.	1	2	3	4	5		
2.	because I want the teacher to think I'm a good student.	1	2	3	4	5		
3.	because I want to learn sport/PE skills.	1	2	3	4	5		
4.	because sport/PE is fun.	1	2	3	4	5		
5.	but I really don't know why.	1	2	3	4	5		
6.	because that's what I am supposed to do.	1	2	3	4	5		
7.	because I would feel bad about myself if I didn't.	1	2	3	4	5		
8.	because it is important for me to do well in sport/ PE.	1	2	3	4	5		
9.	because I enjoy learning new skills.	1	2	3	4	5		
10.	but I don't see why we should have sport/PE.	1	2	3	4	5		
11.	so that the teacher won't yell at me.	1	2	3	4	5		
12.	because I want the other students to think I'm good.	1	2	3	4	5		
13.	because I want to improve in sport/PE.	1	2	3	4	5		
14.	because sport/PE is exciting.	1	2	3	4	5		
15.	but I really feel I'm wasting my time in sport/PE.	1	2	3	4	5		
16.	because that's the rule.	1	2	3	4	5		
17.	because it bothers me when I don't.	1	2	3	4	5		



**SECTION D: What are your views on sport ability?**

Please answer each question below. We are interested in your opinions. There are no right or wrong answers. Please circle one number for each question which best represents your opinions.

	Strongly Disagree				Strongly Agree
	1	2	3	4	5
1. We have a certain level of ability in sport and we cannot really do much to change that level.	1	2	3	4	5
2. To be successful in sport you need to learn techniques and skills, and practice them regularly.	1	2	3	4	5
3. Even if you try, the level you reach in sport will change very little.	1	2	3	4	5
4. You need to have a certain “gifts” to be good at sports.	1	2	3	4	5
5. You need to learn and to work hard to be good at sport.	1	2	3	4	5
6. In sports, if you work hard at it, you <u>will</u> <u>always</u> get better.	1	2	3	4	5
7. To be good at sports, you need to be born with the basic qualities which allow you success.	1	2	3	4	5
8. To reach a high level of performance in sport, you must go through periods of learning and training.	1	2	3	4	5
9. How good you are at sports will <u>always</u> improve if you work at it.	1	2	3	4	5
10. It is difficult to change how good you are at sport.	1	2	3	4	5
11. To be good at sport you need to be naturally gifted.	1	2	3	4	5
12. If you put enough effort into it, you will <u>always</u> get better at sport.	1	2	3	4	5

**Section E: What I Am Like**

	Really True for me	Sort of True for me			Sort of True for me	Really True for me	
1	<input type="checkbox"/>	<input type="checkbox"/>	Some kids do very well at all kinds of sports	<b>BUT</b>	Other kids don't feel they are very good when it comes to sports.	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are proud of themselves physically	<b>BUT</b>	Other kids don't have much to be proud of physically.	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish they could be a lot better at sports	<b>BUT</b>	Other kids feel that they good enough at sports.	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	Some kids don't feel very confident about themselves physically	<b>BUT</b>	Other kids really feel good about themselves physically.	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	Some kids think they could do well at just about any new sports activity they haven't tried before	<b>BUT</b>	Other kids are afraid they might not do well at sports activity they haven't tried.	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are very satisfied with themselves physically	<b>BUT</b>	Other kids are often dissatisfied with themselves physically.	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>	<input type="checkbox"/>	In games and sports some kids usually watch instead of play	<b>BUT</b>	Other kids usually play rather than watch.	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	Some kids are unhappy with how they are and what they can do physically	<b>BUT</b>	Other kids are happy with how they are and what they can do physically.	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	Some kids feel that they are better than others their age at sports	<b>BUT</b>	Other kids don't feel they can play as well.	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/>	<input type="checkbox"/>	Some kids have a positive feeling about themselves physically	<b>BUT</b>	Other kids feel somewhat negative about themselves physically.	<input type="checkbox"/>	<input type="checkbox"/>

	Really True for me	Sort of True for me			Sort of True for me	Really True for me	
11	<input type="checkbox"/>	<input type="checkbox"/>	Some kids don't do well at new outdoor games	<b>BUT</b>	Other kids are good at new games right away.	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/>	<input type="checkbox"/>	Some kids wish that they could feel better about themselves physically	<b>BUT</b>	Other kids always seem to feel good about themselves physically.	<input type="checkbox"/>	<input type="checkbox"/>

Please check that you have given an answer for every question.

Thank you for helping out in the survey.



## Appendix 5a

### Study 4 Pilot Study First Questionnaire

#### Part 1

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Please answer all the questions. We are interested in your opinions. There are no right or wrong answers. Please circle one number for each question which best represents your opinion.

#### **SECTION A: What are your views on golf putting ability?**

- |   | Strongly<br>Disagree |   |   |   | Strongly<br>Agree |
|---|----------------------|---|---|---|-------------------|
| 1. It is difficult to change how good you are in golf putting today in school.                                    | 1                    | 2 | 3 | 4 | 5                 |
| 2. To be successful in the golf putting test you need to learn techniques and skills and practice them regularly. | 1                    | 2 | 3 | 4 | 5                 |
| 3. To be good in the golf putting test you need to be naturally gifted.   | 1                    | 2 | 3 | 4 | 5                 |
| 4. How good you are in the golf putting test will <u>always</u> improve if you work at it.                        | 1                    | 2 | 3 | 4 | 5                 |

#### **SECTION B: To what extent do you think that you are good at golf putting?**

Not at all

Very much so

1

2

3

4

5

6

7

## Appendix 5b

### Study 4 Pilot Study Second Questionnaire

#### Part 2

Name: \_\_\_\_\_

#### Section A: Please tell us your preferred choice for the golf putting:

	No true at all				Very much true		
1. I like to play in levels that are not too hard, so I don't get bad scores.	1	2	3	4	5	6	7
2. I like to try difficult and challenging levels so that I can try to learn from the task, even if I won't do well.	1	2	3	4	5	6	7

#### Section B: How did you feel about the golf putting test?

	Not At All				Very Much So		
1. To what extent do you think that you were good at the golf putting test today in school?	1	2	3	4	5	6	7

2. The golf putting test today in school, made me feel:

	Not At All				Very Much So		
a) Tense:	1	2	3	4	5	6	7
b) Happy:	1	2	3	4	5	6	7
c) Anxious:	1	2	3	4	5	6	7

## Appendix 6a

### Study 4 Main Study First Questionnaire

#### Part 1

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Please answer all the questions. We are interested in your opinions. There are no right or wrong answers. Please circle one number for each question which best represents your opinion.

#### SECTION A: What are your views on golf putting ability?

- |   | Strongly<br>Disagree |   |   |   |   | Strongly<br>Agree |
|---|----------------------|---|---|---|---|-------------------|
| 1. It is difficult to change how good you are in golf putting today in school.                                    | 1                    | 2 | 3 | 4 | 5 | 6                 |
| 2. To be successful in the golf putting test you need to learn techniques and skills and practice them regularly. | 1                    | 2 | 3 | 4 | 5 | 6                 |
| 3. To be good in the golf putting test you need to be naturally gifted.   | 1                    | 2 | 3 | 4 | 5 | 6                 |
| 4. How good you are in the golf putting test will <u>always</u> improve if you work at it.                        | 1                    | 2 | 3 | 4 | 5 | 6                 |
| 5. Do you have any experience in golf putting? <u>Yes / No</u> .<br>If Yes, How long: _____ (please write)        |                      |   |   |   |   |                   |
|   | Very Uncertain       |   |   |   |   | Very Certain      |
| 6. To what extent are you certain that golf putting ability is a natural gift?                                    | 1                    | 2 | 3 | 4 | 5 | 6                 |
| 7. To what extent are you certain that golf putting ability can improve?  | 1                    | 2 | 3 | 4 | 5 | 6                 |



Please circle one number between 1 to 6 which best represents your feeling and thoughts about taking part in the golf putting test today in the school.

**SECTION B: My thoughts about the golf putting test today in school.**

**I intend to do the golf putting test today in school .....**

	Not at all				Very much so	
1. to do better than others in golf putting	1	2	3	4	5	6
2. to learn from the golf putting test	1	2	3	4	5	6

**SECTION C: What I expect from myself in golf putting test today in the school?**

**I expect myself to ....**

	Not at all				Very much so	
1. do well in the golf putting test today	1	2	3	4	5	6
2. be among the best in the golf putting test today	1	2	3	4	5	6

## Appendix 6b

### Study 4 Main Study Second Questionnaire

**Part 2**

Name: \_\_\_\_\_

**Section A: Please tell us your preferred choice for the golf putting:**

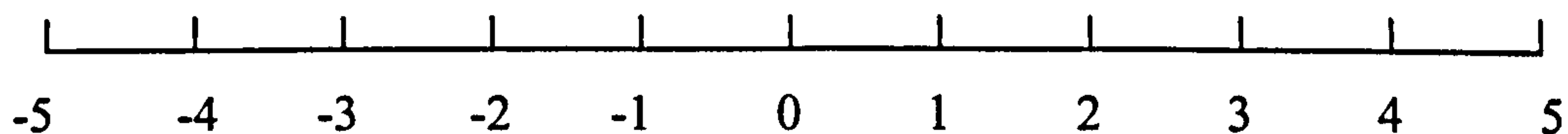
	Strongly Disagree				Strongly Agree							
	1	2	3	4	5	6	6	5	4	3	2	1
1. I like to play in levels that are not too hard, so I don't get bad scores.												
2. I like levels that are hard enough to show that I am good in golf.												
3. I like levels that are fairly easy, so I will do well.												
4. I like to try difficult and challenging levels so that I can try to learn from the task, even if I won't do well.												

**Section B: How did you feel about the golf putting test?**

1. To what extent did you find golf putting test today in the school enjoyable?

**Unenjoyable**

**Enjoyable**



2. The golf putting test today in school, made me feel:

	Not At All				Very Much So	
	1	2	3	4	5	6
a) Tense:	1	2	3	4	5	6
b) Happy:	1	2	3	4	5	6
c) Anxious:	1	2	3	4	5	6

3. If we offer a programme for golf putting in the school, how much would you want to participate in the programme to learn golf putting?

Not At All				Very Much	
1	2	3	4	5	6

4. If we organise a golf putting competition in the school, how much would you want to participate in the competition?

Not At All				Very Much	
1	2	3	4	5	6

**Section C: What are the reasons for your success/failure to do well in the golf putting test?**

**I did well/didn't do well in the golf putting test today in school because...**

	Strongly Disagree				Strongly Agree	
	1	2	3	4	5	6
1. I worked/didn't work hard enough	1	2	3	4	5	6
2. I am good/not good in the golf putting task	1	2	3	4	5	6



## Appendix 7

### Study 5 Pre-Questionnaire

#### SECTION A

1. Name: \_\_\_\_\_
2. Date of Birth: \_\_\_\_\_
3. Age: \_\_\_\_ years \_\_\_\_ months

Class: \_\_\_\_\_

Gender: Male / Female

#### SECTION B: When do you feel successful in sport/PE?

Read each sentence carefully and decide to what extent you agree with it. Indicate how you feel most of the time by circling one number for each statement.

**I feel most successful in sport/PE when .....**

	Strongly Disagree				Strongly Agree
1. I beat other people.	1	2	3	4	5
2. I am clearly superior.	1	2	3	4	5
3. I am the best.	1	2	3	4	5
4. I work hard.	1	2	3	4	5
5. I show clear personal improvement.	1	2	3	4	5
6. I outperform my classmates.	1	2	3	4	5
7. I accomplish something others can't do.	1	2	3	4	5
8. I reach a goal.	1	2	3	4	5
9. I overcome difficulties.	1	2	3	4	5
10. I master something I couldn't do before.	1	2	3	4	5
11. I show other people I am the best.	1	2	3	4	5
12. I perform to the best of my ability.	1	2	3	4	5

**SECTION C: What I am like in sport/PE?**

Please circle a number to indicate how much these statements are, or are not, like you.

This is not at all like me	This is very much like me
----------------------------------	---------------------------------

- |   | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Some people feel that they are good when it comes to playing sport/PE.                             | 1 | 2 | 3 | 4 | 5 |
| 2. Some people feel that they are among the best when it comes to sport/PE or athletic ability.       | 1 | 2 | 3 | 4 | 5 |
| 3. Some people are quite confident when it comes to taking part in sports/PE activities.              | 1 | 2 | 3 | 4 | 5 |
| 4. Some people feel that they are one of the best when it comes to joining in sport/PE activities.    | 1 | 2 | 3 | 4 | 5 |
| 5. Some people are sometimes a little slower than most when it comes to learning new sport/PE skills. | 1 | 2 | 3 | 4 | 5 |
| 6. Given the chance, some people are one of the first to join in sport/PE activities.                 | 1 | 2 | 3 | 4 | 5 |

## Appendix 8a

### Study 5 Experiment 1 Part 1 Questionnaire

#### SECTION A

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

#### SECTION B: When will you feel most successful in the golf putting task today in school?

I will feel most successful in the golf putting task today in the school if .....

Strongly disagree	Strongly agree
-------------------	----------------

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. I beat other people.                     | 1 | 2 | 3 | 4 | 5 |
| 2. I am the best.                           | 1 | 2 | 3 | 4 | 5 |
| 3. I show clear personal improvement.       | 1 | 2 | 3 | 4 | 5 |
| 4. I master something I couldn't do before. | 1 | 2 | 3 | 4 | 5 |

#### SECTION C: What I expect from myself in golf putting task today in the school?

Please circle a number to indicate how much you agree with these statements.

Strongly disagree	Strongly agree
-------------------	----------------

**I expect myself to**

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. be good in the golf putting task today           | 1 | 2 | 3 | 4 | 5 |
| 2. be among the best in the golf putting task today | 1 | 2 | 3 | 4 | 5 |



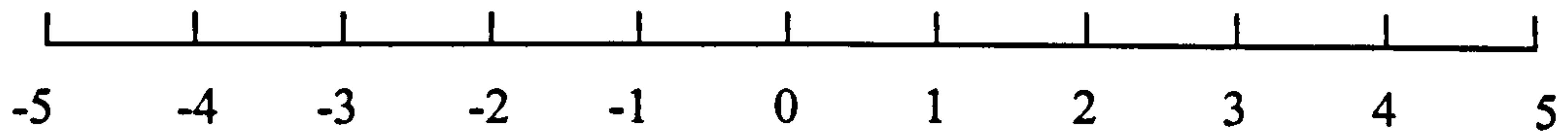
## Appendix 8b

### Part 2

1. To what extent did you find golf putting task today in the school enjoyable.

**Unenjoyable**

**Enjoyable**



2. To what extent do you think that you were good at the golf putting task today in the school?

**Not at all**

**Very much so**

1      2      3      4      5      6      7

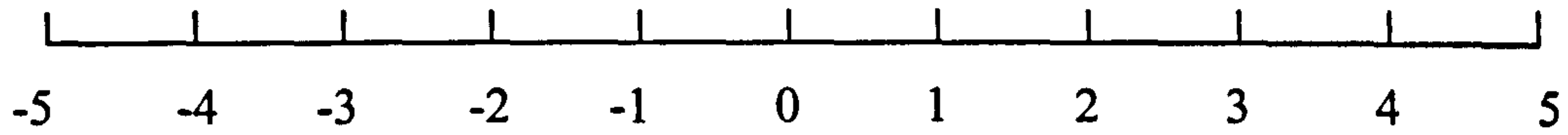
## Appendix 8c

### Part 3

1. To what extent did you find enjoyable the period of time that you spent with the golf putting task while you were allowed to do anything you wanted?

**Unenjoyable**

**Enjoyable**



## Appendix 9

### Study 5 Experiment 2 Part 1 Questionnaire

#### SECTION A

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

#### SECTION B: When will you feel most successful in the golf putting task today in school?

**I will feel most successful in the golf putting task today in the school if .....**

	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Strongly disagree</td> <td style="width: 50%; text-align: center;">Strongly agree</td> </tr> </table>					Strongly disagree	Strongly agree
Strongly disagree	Strongly agree						
1. I beat other people.	1	2	3	4	5		
2. I am the best.	1	2	3	4	5		
3. I show clear personal improvement.	1	2	3	4	5		
4. I master something I couldn't do before.	1	2	3	4	5		

#### SECTION C: What I expect from myself in golf putting task today in the school?

Please circle a number to indicate how much you agree with these statements.

	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Strongly disagree</td> <td style="width: 50%; text-align: center;">Strongly agree</td> </tr> </table>					Strongly disagree	Strongly agree
Strongly disagree	Strongly agree						
<b>I expect myself to</b>							
1. be good in the golf putting task today	1	2	3	4	5		
2. be among the best in the golf putting task today	1	2	3	4	5		



**SECTION D: How do you feel ?**

1. To what extent do you feel having choice over your decision to do golf putting today in school?

**Not at all choice**

1

2

3

4

5

**Very much choice**

6

7

2. To what extent do you feel responsible over your decision to do golf putting today in school?

**Not at all responsible**

1

2

3

4

5

**Very much responsible**

6

7