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Interactons between achievement goal orientations and motivational climate

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INTERACTIONS BETWEEN ACHIEVEMENT GOAL ORIENTATIONS AND MOTIVATIONAL CLIMATE

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CONTENTS

SUMMARY STATEMENT

The objective of this thesis was to examine the relationship between achievement goal orientations and motivational climate in sport contexts. Specifically, the research aimed to examine how complimentary versus conflicting motivational climates might interact with athletes' dispositional goal orientations. Reservations over existing measures of achievement goal orientations lead to the development of a new measure of achievement goals. The first study investigated the structural integrity of a four-goal model of achievement goal orientations utilising confirmatory factor analysis and explored the concurrent validity of the four-goal model with an existing measure of achievement goal orientations. The second study examined the predictive validity of the four-goal model of achievement goals explored in study one with regards to a process focus in rugby union players. The third study examined the influence of the interaction between motivational climate and achievement goals, using an existing measure of achievement goals, on motivation and tension. The final study examined the influence of the interaction between motivation climate and achievement goals, using the four-goal measure of achievement goals developed in study one, on motivation and tension. Results indicated that: (a) the 20-item, four-goal model of achievement goals possessed very good factor structure, good concurrent and predictive validity, but that the four factors had relatively high factor-factor correlations; (b) self-directed task was a strong predictor of a process focus; (c) in a strong performance climate, athletes with high levels of ego orientation had high levels of self-determined motivation; (d) in a strong mastery climate, athletes with low levels of ego orientation had high levels of self-determined motivation; (e) in a strong performance climate, high levels of self-directed ego orientation and low levels of social approval ego orientation appear to be beneficial for self-determined motivation; and (f) in a strong mastery climate, high levels of self-directed ego orientation and social approval task orientation appear to be beneficial.

CHAPTER 1

INTRODUCTION

Previous research has found that the climate within which an athlete performs can have an influence over cognitions, affect, and performance (Brunel, 1999; Cresswell, Hodge & Kidman, 2003; Duda & Chi, 1989; Goudas, 1998; Goudas & Biddle, 1994; Goudas, Biddle, Fox & Underwood, 1995; Lloyd & Fox, 1992; Newton & Duda, 1993; Orgell & Duda, 1990; Papaionnou, 1994, 1998; Theebom, DeKnop & Weiss 1995; Vallerand, Gauvin & Halliwell, 1986; White, 1996). However, the consequences of an athlete performing in a motivational climate that is conflicting with their personal motives, goals, or personality has received limited attention. It is this conflict, and the potential consequences of this conflict, that are of primary interest in the current programme of research.

Achievement Goal Orientations

To gain a clear understanding of the relationship between achievement goal orientations and motivational climate, it is important that the theoretical underpinnings of both concepts are outlined. With reference to Achievement Goal Theory development, Maehr and Nicholls (1980), Dweck (1980, 1986), and Nicholls (1984, 1989) were the primary drivers.

Maehr and Nicholls (1980) suggested that achievement motivation is derived from: (a) an individuals' reasons for participating; and (b) how that individual defines success. Based on these two factors, three achievement goals were conceptualised: ability, task and social approval goals. Maehr and Nicholls (1980) defined an *Ability Goal* as the desire to maximise favourable and minimise unfavourable ability perceptions relative to the performance of similar others. For example, if an individual views another performer as having similar ability but outperforms that

individual in a specified task, they will feel successful. In line with Attribution Theory (Weiner, 1985, 1986), when performance outcomes are attributed to high ability compared with others (e.g., score more points than another athlete of similar ability), this will result in feelings of success, positive affect, and future success expectations. Weiss and Chaumeton (1992) proposed that individuals with an ability-focused goal orientation make use of information gathered through social comparisons to evaluate success and failure in terms of demonstrated competence. Maehr and Nicholls (1980) defined a *Task Goal* as the desire to demonstrate ability by accomplishing aspects of the task or activity itself, rather than attaining normative-based success. For example, when an individual experiences improvement at a specified task (e.g., improve serving technique in tennis), feelings of success, positive affect, and future success expectations will result. *Social Approval Goals* were defined as the desire to demonstrate virtuous intent (e.g., maximal effort) and thereby gain social approval for those intentions. For example, when an individual who values receiving approval from significant others receives approval (e.g., positive reinforcement from the coach), this will result in feelings of success, positive affect, and future success expectations.

Research by Maehr and Nicholls (1980) found support for these different achievement goals within diverse cultures and ethnic groups. Weiss and Chaumeton (1992) suggested that individuals with ability goals utilise social comparisons to judge success and individuals with task goals focus on the process of involvement. Social approval goals have received little attention in the sport psychology literature. Vealey and Campbell (1988) found only two goal orientations, with social approval being indistinguishable from ability goals. Ewing (1981) developed a questionnaire (the Achievement Orientation Questionnaire; AOQ) to assess Maehr and Nicholls' (1980)

three achievement goals. However, subsequent research has failed to replicate its factor structure (Pemberton, Petlichkoff & Ewing, 1986; Weiss & Chaumeton, 1992).

Dweck (1980, 1986) proposed the conceptualisation of two achievement goals that exist on a continuum. When competence is defined in a norm-referenced manner, Dweck termed this a *Performance Goal.* For example, an athlete gauges success by comparing their own performance with that of others (similar to an ability goal; Maehr & Nicholls, 1980). Dweck predicted that when an individual had high levels of performance goal orientation and low perceptions of ability, they would attribute failure to low ability, exhibit negative affect (e.g., shame), and have reduced levels of effort and persistence. When competence is defined in a self-referenced manner, Dweck termed this a *Learning Goal* (similar to a task goal; Maehr & Nicholls, 1980). Dweck predicted that when an individual had high levels of learning goal orientation, they would tend to focus upon learning, respond to failure as a temporary setback, and attribute failure to a lack of practice, inappropriate strategy, and/or a need for more effort. Dweck (1986) also proposed that these two goals were placed on a continuum, with a performance goal at one end and learning goal at the other end. This means that if an individual has high levels of a performance goal orientation, they will have low levels of a learning goal orientation and vice versa. Therefore, according to Dweck (1986), these two achievement goals are bipolar.

Nicholls (1984) defined achievement behaviour as being concerned with demonstrating high rather than low ability. Nicholls (1984) defined *Task Involvement* (similar to a Learning Goal, Dweck, 1980; and a Task Goal, Maehr & Nicholls, 1980) when "ability can be judged as high or low with reference to the individuals own past performance...gains in mastery indicate competence" (p. 328). Nicholls defined *Ego Involvement* (similar to a Performance Goal, Dweck, 1980; and an Ability Goal,

Maehr & Nicholls, 1980) when "ability can be judged as capacity relative to that of others...to demonstrate high capacity, one must achieve more with equal effort or use less effort than others for an equal performance" (p. 328).

Nicholls (1984, 1989) also proposed the existence of two goal orientations (dispositions) that reflect an individual's tendency to adopt different types of involvement in an achievement situation. Nicholls (1984, 1989) described these two dispositional goals as independent of one another (i.e., orthogonal). That is, an individual can have high levels of both goal orientations, high levels of one and low levels of the other, or low levels of both goal orientations. Nicholls' (1984, 1989) proposition, that dispositional achievement goals are orthogonal, has been supported in subsequent research (Chi & Duda, 1995; Harwood & Swain, 1998; Li, Harmer & Alcock, 1996; Roberts, Treasure & Kavussanu, 1996). Based on personal communications with other achievement-goal researchers, Harwood, Hardy, and Swain (2000) suggested that states of goal involvement might not be orthogonal. However, Harwood and Hardy (2001) subsequently stated, "goal involvement states are supposed to reflect the current means by which achievement will be judged and there is no a priori reason why the two criteria cannot be used simultaneously...but possibly at an unconscious level of cerebral processing" (p. 334). Nicholls' (1989) work does not clarify his position over the relationship (i.e., bipolar versus orthogonal) between states of goal involvement. To the best of the present author's knowledge, only one study (Harwood & Swain, 1998) has to date reported a correlation between state task and ego goals ($r = -0.14$, $p>0.05$) in junior tennis players. In addition, a qualitative study on a sample of youth tennis players found that six out of the 17 participants had a High Ego/High Task state goal profile (Harwood

& Swain, 2001). Both of these findings suggest that state goals may be orthogonal in a performance context.

According to research conducted by Nicholls and Miller (1983, 1984), young children conceptualise ability as effort (e.g., if a child puts in a high level of effort, they have high levels of ability) or ability as capacity (e.g., ability is independent of effort). Nicholls and Miller's research indicated that by 12 years of age, children are able to differentiate between ability and effort. Task involvement, according to Nicholls (1984), was associated with an undifferentiated concept of ability and effort and "improving ones mastery of tasks" (p. 329). Ego involvement was associated with when an "individual seeks to demonstrate ability in a differentiated sense" (Nicholls, 1984, p. 329) and demonstrate normative superiority. Subsequent researchers have also made a link between achievement goal involvement and the differentiation of ability and effort. Duda and Whitehead (1998) stated that "the two goal orientations, labelled task and ego orientations, relate to whether an individual is more or less likely to employ a undifferentiated or differentiated concept of ability" (p. 24). However, no empirical research has supported this hypothesised link between achievement goal involvement and the differentiation of ability and effort.

Hardy (1997, 1998) questioned the role of the differentiation of effort and ability in underpinning achievement goal orientations. Harwood *et al.* (2000) clarified that the differentiation of ability and effort is a bipolar construct (i.e., if one is able to differentiate between ability and effort, one cannot simultaneously undifferentiate ability and effort). According to Hardy (1997, 1998), Harwood et al (2000), and Harwood and Hardy (2001), as goal orientations are orthogonal, the association between the conceptualisation of task and ego involvement (orthogonal) and the differentiation of ability and effort (bipolar) cannot be equivalent. This association

raises concerns over the original conceptualisation of task and ego goals (Nicholls, 1984, 1989), as they frequently seem to be equated with the concept of differentiation (Duda & Whitehead, 1998; Ntoumanis & Biddle, 1999; Ommunsden, Roberts & Kavussanu, 1998), which negates one of the primary features of achievement goal orientations (i.e., orthogonality). Harwood and Hardy (2001) argued that the differentiation of ability could not underpin an individual's conception of success. They suggest that what is happening is that the "individual is equating or defining achievement or success in a given task with effort and/or skill mastery, even though s/he fully understands that ability and effort are not the same construct and that other performers have higher levels of ability" (p. 335).

Hardy (1997, 1998) argued that previous researchers (Duda, 1997; Nicholls, 1989) have confounded the definitions of goal orientations with possible correlates of goal orientations. Hardy (1997) argued, "the current conceptualisation of task orientation appears to confound personal improvement with process" (p. 282). Harwood and Hardy (2001) stipulate that "it is important to separate out the achievement of processes that may correlate with task involvement (e.g., effort), from the achievement of subjective and objective outcomes or products associated with task involvement (e.g., task mastery)" (p. 337). Hardy (1998) proposed that there is no logical reason why an individual with high levels of task orientation, as defined by Nicholls (1989), should have any stronger focus upon the process (effort, enjoyment) of performing, than an individual with high levels of ego orientation. In agreement with Hardy (1998), it does seem plausible that an athlete who has high, as opposed to low, levels of ego orientation would invest effort and gain enjoyment from a situation if it served to satisfy their conception of achievement (i.e., demonstrate superiority over opponents). However, past research has utilised measurement tools that

reinforce this confounding of personal improvement with hypothesised correlates or processes (e.g., I work hard'). It is, therefore, no surprise that past research that has employed these measurement tools has found positive associations between task orientation and effort and/or enjoyment.

As highlighted above, researchers have levelled criticisms at measurement tools designed to assess achievement goal orientations. Hardy (1998) suggested that the task orientation sub-scale of the Task and Ego Goal Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992) confounds the definition of a task orientation (perceptions of competence are self-referenced) with hypothesised correlates of a task orientation (e.g., effort and enjoyment). Harwood *et al.* (2000) discussed the potential limitations of the development process of the TEOSQ (Duda & Nicholls, 1992). The TEOSQ was derived from a classroom measure of achievement goal orientations, the Motivation Orientation Scale (MOS; Nicholls, 1989; Nicholls, Patashnick & Nolen, 1985). Items in the task sub-scale of the MOS focused on statements related to working hard (effort), learning, and thinking, all of which are hypothesised behavioural correlates of being task involved. Harwood *et al.* (2000) have argued, "this creates a critical concern for the MOS and any measurement device derived from it" (p. 244). Harwood *et al.* also raised concerns over the ego sub-scale of the TEOSQ. They argued, "some of TEOSQ ego items...lack sport specificity and relevance" (p. 247). Athletes highlighted, for example, "I can do better than my friends" as an item that was open to misinterpretation, as the question related to their own team mates as opposed to members of the opposing team (Harwood, 2000). On considering these issues, the present author had concerns over the validity of research conducted utilising the TEOSQ. For example, several studies have found an association between a task orientation and the belief effort leads to success (Duda,

Fox, Biddle & Armstrong, 1992; Duda & White, 1992; Hom, Duda & Miller, 1993; Newton & Duda, 1993; Treasure & Roberts, 2001) and between task orientation and enjoyment (Duda, Chi, Newton, Walling & Cately, 1995; Duda, Newton & Chi, 1990). This is not surprising as an item in the task orientation sub-scale of the TEOSQ (Duda & Nicholls, 1992) directly assesses effort (e.g., 'I really work hard') and another item directly assesses enjoyment (e.g., 'I learn something that is fun to do'). However, there are no such items in the ego orientation subscale of the TEOSQ that assesses effort (e.g., 'I work really hard to outperform my opponent') or enjoyment ('I have fun when I outperform my opponent').

The other widely employed measure of achievement goals is the Perception of Success Questionnaire (POSQ; Roberts, Treasure & Balague, 1998). Harwood *et al.* (2000) acknowledge that the POSQ has undergone extensive scale development to maximise its sensitivity to sporting contexts and, as a consequence, the task sub-scale of the POSQ focuses more on personal performance, improvement, goal attainment, and problem solving. A study by Harwood (2000) revealed that high level performers perceived the task and ego sub-scale items of the POSQ as more relevant to achievement in competition compared to the task and ego items in the TEOSQ. However, Harwood *et al.* (2000) still contend that items in the task sub-scale of the POSQ, such as 'I work hard', can still be viewed as an item that assesses a behavioural correlate of task involvement (i.e., effort).

These criticisms of existing measures of achievement goals raise serious concerns regarding the use of the TEOSQ and POSQ to measure achievement goals in the current programme of research. In light of these concerns, a new measure of achievement goal orientations was developed to ensure that the relationship between

achievement goals and motivational climate could be examined without potential confounds.

Harwood and Swain (2001) conducted interviews with young tennis players and concluded from their investigations that these athletes defined success in task and ego involving terms for both self-directed and socially driven reasons. More specifically, they found that junior tennis players placed value on gaining approval from others for outcomes (e.g., 'I wanted to prove to my coach that I could win so he would be impressed') and placed value on the personal consequences of outcomes (e.g., 'I just wanted to win for myself'). In addition, they found a lack of pure mastery-driven expectations (e.g., 'to improve my first serve percentage') during competitive situations. Only when the players perceived that their ability was low compared to their opposition (i.e., they perceived they were not going to win), did pure task involvement dominate their thinking. Perhaps self-directed task involvement may be more prevalent in training or non-competitive situations. Harwood and Swain (2002) suggested that those tennis players interviewed in the Harwood and Swain (2001) study made distinctions between adopting a task involved goal for purely self-directed reasons versus defining success through gaining approval from significant others for self-referent improvement (e.g., 'prove to my coach that I can improve my first serve percentage').

As a follow up to their qualitative research, Harwood and Swain (2002) developed an instrument (the Profile of Goal Involvement Questionnaire; PGIQ) that assessed self-directed and social approval components of task and ego involvement within an ideographic intervention. Harwood and Swain (2002) stated, "accounting for the need to conceptualise progress in the measurement of goal involvement, the PGIQ reflects a first move towards a more comprehensive measurement of goal

involvement in a competitive context" (p. 116). The 12-item PGIQ was designed to measure two forms of task and ego involvement: self-directed and social approval. Each variable was assessed via three items. Due to the small sample size, no reliability analyses were conducted. Results of their intervention demonstrated reduced social approval ego involvement and increased self-directed task involvement within youth tennis players prior to ego involving match situations. As Harwood and Swain (2002) admit, the PGIQ does reflect only a 'first move' towards the development of a comprehensive measurement tool of goal involvement. Due to the lack of model testing procedures, the validity and reliability of this measure is questionable. However, the PGIQ does provide a framework from which further item development and psychometric testing could evolve (see Study One: chapter 2).

Achievement Goal Research

In applying Nicholls' (1984, 1989) academic based Achievement Goal Theory to sport, Duda (1987) outlined several distinctions between the two contexts. In a sport context: (a) participants distinguish between global athletic ability as capacity and sport skill (Roberts, 1984; Roberts & Pascuzzi, 1979). Skill level is viewed as being unstable compared to natural athletic ability; (b) the nature of ability, effort and task difficulty are more obvious than in academic/cognitive tasks; (c) sport activities allow observers to witness the performance process and the performance outcome; and (d) evaluation and competition against others is at the heart of most sporting competitions.

While Duda (1987) highlighted four differences between academic and sporting contexts, she also described similarities that allowed the adaptation of Nicholls' (1984; 1989) Achievement Goal Theory to sport: (a) conceptions of ability vary with age; (b) an individual's definition of success (e.g., "I feel successful when I

improve my performance") forms the basis for the subjective perception of goal accomplishment (e.g., "I was successful because I improved my performance"); (c) athletes can be oriented towards both task and ego-involved goals (i.e., orthogonal); and (d) goal preference varies with respect to individual differences. For these reasons, Nicholls' (1984, 1989) Achievement Goal Theory has been extensively adopted by sport psychology researchers over the past 18 years (see Duda, 1992 for review).

In general, past research has found that individuals with high levels of task orientation: derived satisfaction from mastery experiences (Lochbaum & Roberts, 1993; Treasure & Roberts, 1994; Williams, 1994); believed effort leads to success (Duda, Fox, Biddle & Armstrong, 1992; Duda & White, 1992; Hom, Duda & Miller, 1993; Newton & Duda, 1993; Treasure & Roberts, 1994); experienced enjoyment (Duda, Chi, Newton, Walling & Cately, 1995; Duda, Newton & Chi, 1990); were intrinsically motivated (Duda, Newton & Chi, 1990; Goudas, Biddle, Fox & Underwood, 1995); had less task-irrelevant worry and negative thoughts (Newton & Duda, 1993; White & Duda, 1993); and perceived their parents to have high levels of task orientation (Ebbeck & Becker, 1994).

Previous research has found that individuals with high levels of ego orientation: derived satisfaction from normative success (Treasure & Roberts, 1994; Lochbaum & Roberts, 1993; Williams, 1994); believed success stems from having more natural ability than others (Duda, Fox, Biddle & Armstrong, 1992; Duda & White, 1992; Hom, Duda & Miller, 1993; Newton & Duda, 1993; Treasure & Roberts, 1994); reported enhanced self-esteem (Duda, 1989); believed sport leads to higher status (Duda, 1989); believed sport leads to building a competitive spirit and popularity (Duda, 1989); demonstrated performance worries (Newton & Duda, 1993);

experienced low self-efficacy and high levels of pre-competition anxiety (Duda, Newton & Chi, 1990); demonstrated a likelihood to approve of unsportsmanlike play (Duda, Olsen & Templin, 1991); and demonstrated practice avoidance (Lochbaum & Roberts, 1993).

Previous research has found high levels of task orientation are mainly associated with positive factors (e.g., effort, enjoyment, intrinsic motivation) and high levels of ego orientation are mainly associated with negative factors (e.g., increased performance worry, anxiety, practice avoidance). However, in light of the issues raised with regards to the conceptualisation and measurement of achievement goals, these results should be interpreted with caution. In addition, these studies all ignore potential interactions between task and ego orientations and other motivation related variables (see later), which, if considered, could have impacted upon the results.

Motivational Climate

The current understanding of the situational antecedents of goal involvement originates from the work of Ames (1984, 1992a, b, c). Ames (1992a) distinguished between mastery (task) and performance (ego) perceptions of motivational climates in her work in education settings. These distinctions were underpinned by the work of Epstein (1989) who outlined six variables that assist teachers in the organisation of the classroom (Task, Authority, Recognition, Grouping, Evaluation, and Time). Ames (1992a) defined a mastery climate as when: (a) students were involved in the decision-making process; (b) their groupings were not based on ability; (c) success was defined and evaluated individual effort and improvement; and (d) discovery of new learning strategies were encouraged. However, a performance climate was defined by Ames (1992a) as when: (a) students focused on learning through interpersonal comparison; (b) evaluations were based on normative standards; (c)

groupings of students were based on ability; and (d) the time allocated for learning was inflexible. Ames (1992a) argued that different learning environments could give qualitatively different meanings to achievement and learning. As stated by Ntoumanis and Biddle (1999), in physical activity contexts, "climates can influence effort, persistence, cognitions, emotions, and behaviour of individuals" (p. 645). However, Ames has not provided clear empirical evidence that the eight constructs outlined above actually map unambiguously onto two performance and mastery climate constructs. This raises questions over the existing conceptualisation of mastery and performance climates.

Motivational Climate Research

In general, research has shown that individuals who perceive their motivational climate as mastery-oriented: focused on performance as opposed to outcomes to judge success (Duda & Chi, 1989); were more intrinsically motivated (Brunel, 1999; Goudas, 1998; Goudas & Biddle, 1994; Goudas *et al.,* 1995; Lloyd & Fox, 1992; Orgell & Duda, 1990; Papaionnou, 1994, 1998; Theebom *et al.*, 1995; Vallerand *et al.*, 1986); had increased perceived physical ability (Kavussanu & Roberts, 1996; Marsh & Peart, 1988; Theebom *et al.*, 1995); experienced greater enjoyment (Kavussanu & Roberts, 1996; Liukkonen, Telema, & Biddle,1998; Lloyd & Fox, 1992; Seifriz, Duda & Chi, 1992; Theebom *et al.,* 1995); invested more effort (Kavussanu & Roberts, 1996); persisted longer (Solomon & Lee, 1997); had lower levels of tension (Kavussanu & Roberts, 1996); experienced greater satisfaction (Ommunsden *et al.,* 1998; Treasure, 1993; Walling, Duda & Chi, 1993); had less performance worry (Walling *et al.*, 1993); experienced improved concentration and more autotelic experiences (Papaioannou & Kouli, 1999); and were more likely to have higher levels of task orientation (Newton & Duda, 1993; White, 1996).

Research has found that individuals who perceive their motivational climate to be performance-oriented: focused on outcomes as opposed to performance to judge success (Duda & Chi, 1989); were intrinsically motivated when individuals also had high levels of perceived competence (Orgell & Duda, 1990); had lower self-esteem (Marsh & Peart, 1988); viewed sport as a means for increasing social status (Ommunsden *et al.*, 1998); were more likely to drop-out (cf. a mastery climate) (Papaionnou, 1997); were more extrinsically motivated (Papaioannou, 1998); and were more likely to have high levels of ego orientation (Newton & Duda, 1993; Ommunsden *et al.*, 1998; White, 1996).

Within research that has reported positive associations between mastery climate and positive affect (e.g., enjoyment, satisfaction, interest) and lower negative affect (e.g., anxiety, boredom), the correlations between variables in those studies have been low to moderate. Findings regarding the association between performance climate and other variables have been largely inconsistent. In addition, several of the above studies investigating the relationship between motivational climates and other motivation, affective and performance related variables have employed measures of motivational climate that have been shown to have questionable validity.

The Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifriz *et al.*, 1992) and the Parent-Initiated Motivational Climate Questionnaire (PIMCQ; White, Duda & Hart, 1992) have demonstrated acceptable internal reliabilities ($\alpha >$ .75), but factor analysis and model testing procedures have, according to Ntoumanis and Biddle (1999), shown weak support for both measurement tools. This limits the confidence of the current author to accept the findings of research (e.g., Cresswell *et al.*, 2003; Ebbeck & Becker, 1994; Goudas, 1998; Ommunsden *et al.*, 1998;

Kavussanu & Roberts, 1996; Seifriz *et al.,* 1992; Treasure, 1993; Walling *et al.,* 1993; White *et al.,* 1992) that has utilised these two measures of motivational climate.

Interactions Between Achievement Goals and Motivational Climate

The rationale for examining interactions between achievement goals and motivational climate is underpinned by the person-environment (P x E) fit hypothesis (Pervin, 1968). This hypothesis suggests that for each individual there are environments that more or less match his or her personality characteristics. A 'match' is predicted to result in high performance, satisfaction, and low levels of anxiety (Hunt, 1973, Hunt & Sullivan, 1974; Stumpfig, 1975). A 'mismatch' is expected to result in performance decrements, dissatisfaction, and high levels of anxiety. Roberts (1992) suggested that an athlete with high levels of task orientation who finds him or herself performing in a strong mastery climate ('match') would feel comfortable and motivated. However, if that same individual found him or herself in a performance climate ('mismatch'), that athlete might perceive conflict and experience reduced motivation levels. Roberts made similar predictions regarding an individual with high levels of ego orientation in a performance and mastery climate.

While several studies have investigated the combined effects of achievement goals and motivational climate in sport or physical activity contexts (Brunel, 1999; Cury, Biddle, Famose, Goudas, Sarrazin & Durrand, 1996; Ommunsden *et al.,* 1998; Papaionnou, 1998; Seifriz, Duda & Chi, 1992; Standage, Duda, & Ntoumanis, 2003; Treasure & Roberts, 1994, 2001), only two studies to date have examined their interactions (Cresswell *et al.,* 2003; Newton & Duda, 1999).

Newton and Duda (1999) examined the interactive effects of achievement goals and motivational climate on intrinsic motivation and beliefs about causes of success in 385 junior female volleyball players. The TEOSQ (Duda & Nicholls,

1992), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda & Yin, 2000), the Intrinsic Motivation Inventory (IMI; McAuley, Duncan & Tammen, 1989) and the Beliefs About the Causes of Success in Sport Questionnaire (BACSSQ; Duda & Nicholls, 1992; Duda & White, 1992; Nicholls, Patashnick & Nolen, 1985) were used to measure achievement goals, motivational climate, intrinsic motivation, and beliefs about causes of success respectively. Moderated hierarchical regression was used to examine main and interactive effects. Results showed a significant interaction for mastery climate and task orientation on effort beliefs. For volleyball players with high levels of task orientation, the belief the effort leads to success was strong and did not change as the climate got more mastery focused. For volleyball players with low levels of task orientation, beliefs that effort leads to success increased as the climate became more mastery-focused. There were no significant interactions on any intrinsic motivation variables and no significant interaction between ego orientation and performance climate, task orientation and performance climate, or ego orientation and mastery climate.

Cresswell, Hodge and Kidman (2003) examined the influence of an interaction between achievement goals and motivational climate on intrinsic motivation in 107 junior soccer players. The TEOSQ (Duda & Nicholls, 1992), the PMCSQ (Seifriz *et al.,* 1992), and the IMI (McAuley *et al.,* 1989) were used to measure goal orientations, motivational climate, and intrinsic motivation respectively. Moderated hierarchical regression analysis was used to examine the main and interactive effects of achievement goals and motivational climate on intrinsic motivation variables (enjoyment/interest, effort/importance, pressure/tension, perceived competence). Results showed a significant interaction for task orientation and mastery climate on perceived competence. Soccer players with high levels of task orientation had high

levels of perceived competence that did not change as the climate became more mastery-focused. Soccer players with low levels of task orientation showed increased levels of perceived competence as the climate became more mastery focused. Cresswell *et al.* (2003) concluded that a strong mastery climate was of distinct importance to an individual's perceptions of competence if they had low levels of task orientation. There were no significant interactions with any other intrinsic motivation variables and no significant interactions between ego orientation and performance climate, task orientation and performance climate, or ego orientation and mastery climate.

In both studies that have examined the interaction of achievement goals with motivation climate, the TEOSQ (Duda & Nicholls, 1992) was utilised to assess levels of task and ego goal orientations. In light of the limitations of this measurement tool outlined previously, the results of these two studies are potentially compromised. As the task subscale of the TEOSQ measures hypothesised behavioural correlates of task orientation, this could have confounded effects. In addition, the ego subscale of the TEOSQ lacks relevance to competitive sport, and as those sampled in both studies were competitive athletes, this may explain the absence of effects found between ego orientation and performance/mastery climate. In addition, Cresswell *et al.* (2003) utilised the PMCSQ (Seifriz *et al.,* 1992), which, as outlined previously, has questionable validity.

Both studies (Cresswell *et al.,* 2003; Newton & Duda, 1999) that have examined the impact of the interaction between motivational climate and achievement goals on intrinsic motivation variables have utilised the Intrinsic Motivation Inventory (IMI; McAuley *et al.* 1989). Markland and Hardy (1997) highlighted two concerns regarding the factorial and construct validity of the IMI. Specifically, Markland and

Hardy suggested that: (a) the results of model testing procedures conducted by McAuley *et al.* (1989, 1991) were far from optimal by current standards; and (b) the hierarchical model underpinning the IMI (McAuley *et al.,* 1989) is conceptually different to the formal propositions of Cognitive Evaluation Theory (Deci & Ryan, 1985). Due to the concerns raised by Markland and Hardy (1997) regarding the IMI and the implications of measurement error when employing multiple regression outlined by Jaccard and Turrisi (2003), the present author had further reservations regarding the findings of Cresswell *et al.* (2003) and Newton and Duda (1999).

In addition to the above reservations, neither Cresswell *et al.* (2003) nor Newton and Duda (1999) investigated the impact of the interaction between achievement goals and motivational climate on other forms of motivation (e.g., extrinsic motivation and amotivation). They also failed to consider social components of goal orientations, which recent studies (Allen, 2003, 2005; Harwood & Swain, 2001; Stuntz & Weiss, 2003) have been found to be salient to the way in which athletes conceptualise achievement.

Rationale for Current Research

The overall objective of this research programme was to examine the interaction between achievement goal orientations and motivational climate. This programme of research was underpinned by the P x E fit hypothesis (Pervin, 1968) and aimed to test Roberts' (1992) prediction that an individual who performs in an environment that is conflicting with their dispositional achievement goal profile would experience reduced motivation and conflict/tension, and an individual who performs in an environment that is complementary with their dispositional achievement goal profile would experience increased motivation and no conflict/tension.

In light of reservations about existing measures, a new measure of achievement goals was developed which: (a) was based on a clear conceptualisation of achievement goals; (b) had items that reflected those conceptualisations and not hypothesised correlates of those conceptualisations; (c) included social components of goal orientations; and (d) had items that were specific and relevant to competitive sport. The programme of research also examined the concurrent (with the POSQ; Roberts *et al.,* 1998) and predictive validity (with process goals) of the new measure.

The programme of research then re-examined the interaction between achievement goals and motivational climate on motivation and tension in an attempt to: (a) clarify the findings of previous interaction research (Cresswell *et al.,* 2003; Newton & Duda, 1999) which found limited interaction results between task orientation and mastery climate, no interactions between ego orientation and performance climate, and no interactions between conflicting orientations and climate (e.g., task orientation and performance climate); (b) compare the interaction results obtained when using an existing measure of achievement goals (POSQ; Roberts *et al.,* 1998) with the new measure; (c) examine the interactive effects of achievement goals and motivational climate on intrinsic, extrinsic and amotivation, as these latter two motivation variables have received no attention in previous interaction research; and (d) utilise a sample with a wide age range and participation in a variety of sports in order to increase the ability to generalise results to a wider spectrum of athletes.

Structure of Thesis

The thesis is written as a collection of papers with a general introduction (this chapter) and a general discussion to tie the programme together at the end. The first paper (chapter 2) investigates the factor structure of a four-goal model of achievement goal orientations utilising confirmatory factor analysis and explores the concurrent

validity of the four-goal model with an existing measure of achievement goal orientations. The second paper (chapter 3) examines the predictive validity of the four-goal model of achievement goals explored in paper one with process goals. The third paper (chapter 4) examines the interaction between motivational climate and achievement goals (assessed by an existing measure of achievement goals), on motivation and tension. The final paper (chapter 5) examines the influence of the interaction between motivation climate and achievement goals, assessed by the four-goal measure of achievement goals developed in paper one, on motivation and tension. As one of the purposes of a PhD is to prepare an individual to independently construct research papers for publication in peer-reviewed journals, it was philosophically desirable to the author to present this programme of research as a collection of papers in this standard form of publication.

CHAPTER 2

ACHIEVEMENT GOALS IN SPORT: TESTING AN ALTERNATIVE MODEL

Abstract

The aim of the present paper was to empirically test Harwood's (1997) and Harwood and Swain's (2001, 2002) conceptualisation of achievement goals. Study One tested a 30-item measure of four conceptual variables; Self-directed Task, Self-directed Ego, Social Approval Task, and Social Approval Ego. Seven hundred and twenty athletes, comprising 308 males and 412 females, participated in the study. Utilising CFA as a model-generating tool, a 16-item, four-factor model emerged with generally good fit statistics [x^2/d.f = 2.99, RMSEA = .05, CFI = .97, SRMR = .03, and NNFI = .96]. In Study Two, a further 674 athletes, comprising 234 female and 440 male athletes, participated in the study. A revised 67-item measure of the four conceptual variables was tested alongside the Perception of Success Questionnaire (POSQ; Roberts *et al.*, 1998) for concurrent validity assessment. Following removal of problem items, fit measures for a 20-item, four-factor model were very good [x^2/d.f = 2.58, RMSEA = .05, CFI = .99, SRMR = .05, and NNFI = .98]. Self-directed Task was significantly correlated with POSQ Task Orientation, while Self-directed Ego, Social Approval Task, and Social Approval Ego were all significantly correlated with POSQ Ego Orientation. However, Self-directed Ego, Social Approval Task, and Social Approval Ego were also all very highly correlated with each other.

The seminal work of Nicholls (1984, 1989) has been the major influence upon our understanding of achievement behaviour in sport and other settings. However, recent critiques of achievement goal research by Hardy, Harwood, and associates (Hardy, 1997, 1998; Harwood, Hardy, & Swain, 2000; Harwood & Hardy, 2001; Harwood & Swain, 2001, 2002) have challenged current thinking regarding achievement goals within the competitive sport domain. The aim of the present paper was to empirically test Harwood's (1997) and Harwood and Swain's (2001, 2002) alternative conceptualisation of achievement goals to further our comprehension of achievement behaviour in competitive sport.

Achievement goals are the means by which people define success when they engage in achievement tasks. Achievement goal theories (e.g., Dweck, 1999; Nicholls, 1989) encompass not only the reasons why individuals participate (e.g., to enhance perceptions of competence), but also the criteria they employ for judging successful or unsuccessful competence outcomes (Pintrich, 2000).

From a conceptual standpoint, there is general acceptance that at least two achievement goals can operate in achievement settings. When gains in personal mastery, self-referent performance and/or learning underpin feelings of competence, individuals are said to be task-involved. In contrast, when superior performance relative to others and normative standards (e.g., beating opposition; performing similarly with less effort) underpin perceptions of competence, individuals are said to be ego-involved.

The measurement of achievement goals has largely comprised assessments of the dispositional proneness to be task and/or ego involved. Commonly termed 'achievement goal orientations', the respective task and ego goal orientations have been most commonly measured using two scales: The Task and Ego Orientation in

Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992) and the Perceptions of Success Questionnaire (POSQ; Roberts *et al.,* 1998). It has been suggested that both of these scales have demonstrated reliable internal structure over a large number of studies investigating both the determinants and consequences of goal orientations (see Duda & Whitehead, 1998; Duda, 2001; Roberts, 2001). However, in the original validation work carried out by Duda and Nicholls (1989) on the TEOSQ, the task orientation subscale only reached an alpha level of 0.62. In addition to this, Chi and Duda (1995) conducted confirmatory analysis across a variety of samples (e.g., intercollegiate, college, high school and junior high school students) and reported that the CFA results supported the hypothesised two-factor structure, but admitted the results were weak in the sample of college students [x^2/d.f = 5.48; CFI = .74]. In reality, according to current fit indices cut-off levels suggested by Hu and Bentler (1999), the CFA results for intercollegiate [x^2/d.f = 2.54; RMSEA = .06; CFI = .84], high school [x^2/d.f = 3.72; CFI = .86], and junior high school [x^2/d.f = 3.01; CFI = .85] students were all weak. Previous researchers (Hardy, 1997, 1998; Harwood *et al.,* 2000; Harwood & Hardy, 2001) have also criticised the measures. The main thrusts of the criticisms are that (a) in the transfer of Nicholls' (1989) work from education to sport (Duda, 1989), many of the unique qualities that are prevalent in sport (e.g., competition, social interaction, evaluation) were not addressed; (b) some of the task scale items measure hypothesised behavioural correlates (e.g., effort and fun) of task orientation, not the construct itself; and (c) the measures fail to recognise social goals (e.g., approval, avoidance, belonging) which may be more applicable to sport compared to an education context.

It is perhaps important to reiterate one of the criticisms that have been levelled at both Duda and Nicholls (1992), and Roberts *et al.'s* (1998), operationalisation of

task orientation. Nicholls' (1989) original conceptualisation of task goal orientation appeared to be that task oriented individuals feel successful when they experience personal improvement. Subsequently, researchers (e.g., Duda & Whitehead, 1998; Duda, 1989, 2001; Roberts, 2001) extended this definition to either the experience of personal improvement or investment of effort. The logic underpinning this decision appears to have been that task oriented individuals were hypothesised not to differentiate between effort and ability. Quite apart from the fact that this assumption makes effort a hypothesised correlate of task orientation, not a part of its conceptualisation, it also raises two other problems. First, as Hardy (1997, 1998) has pointed out, the two components of such a definition of task orientation are logically incompatible. The experience of personal improvement has been repeatedly shown to be orthogonal to the equivalent definition of ego orientation (demonstrating superior performance relative to others). But the ability or choice to differentiate between ability and effort clearly lies on a bipolar continuum from "does not differentiate between effort and ability" (task oriented) to "does differentiate between effort and ability" (ego oriented). Second, if a person has high levels of task orientation, they need to either improve their personal performance *or* exert high effort in order to feel competent. What the does it mean to such a person when s/he tries hard but observes no change in performance? It is difficult to believe that they will feel competent. In light of these arguments Hardy (1997, 1998) proposed that, to be conceptually pure, any measure of task orientation should include only items that make reference to self-improvement or absolute standards of performance.

The role that significant others (e.g., parents, coaches, and team mates) play in the belief and cognitive behavioural patterns of athletes is well supported within achievement goal and motivational climate research (e.g., Duda & Hom, 1993;

Newton, Duda & Yin, 2000). While the role of significant others in constructing a task and/or ego involving climate is acknowledged in the assessment of climate, their potential role in the conceptualisation of an athletes' own achievement goals (i.e., feel successful when I show my coach I have improved) is not formally acknowledged in current dispositional measures.

Within the academic context, Maehr and Nicholls (1980) supported the relevance of social goals in their original theory of achievement motivation. Urdan and Maehr (1995) also called for researchers to reconsider a variety of social goals in the achievement domain (e.g., social solidarity, social approval). Nicholls (1984) rejected social approval goals because he thought they lacked applicability and a theoretical basis in academic contexts. Unlike the classroom, competitive sport is very public and often very social. Consequently, it seems reasonable to argue that the role of significant others, and the social context in which sport takes place, could be so salient to competitive athletes that their (sport-related) achievement orientations might comprise certain social features worthy of investigation.

More recently, Cumming, Gano-Overway, Stefanek and Ewing (2000) included the assessment of a separate social approval goal orientation as part of their Multiple Goal Orientation in Sport (MGOS) questionnaire. Further, Stuntz and Weiss (2003) investigated the influence of social achievement goals (e.g., friendship, peer acceptance and coach approval) and situational contexts on behaviours associated with aggression in sport. They utilised a modified TEOSQ (Duda & Nicholls, 1992) to assess task, ego, and social approval goals. Factor analysis suggested that coach praise, friendship and group acceptance goals were distinct from task and ego goals and that the five goals were distinct from one another. Allen (2003, 2005) has

developed a three-factor model to assess social goal orientations. Factor analysis suggests that affiliation, recognition, and status were distinct from one another.

Research within education has shown that the concepts of ego involvement and social approval appear to be highly correlated (Nicholls, Cobb, Wood, Yackel & Patashnick, 1990; Nicholls *et al.*, 1985; Urden, Turner, Park & Midgely, 1992). This may suggest that deriving a sense of academic competence by proving oneself to others is associated with normative accomplishment. However, in sport, a study by Harwood and Swain (2001) documented that young tennis players defined success in task and ego involving terms for both self-directed and socially-driven reasons. As a follow up to their qualitative research, Harwood and Swain (2002) developed an instrument (the Profile of Goal Involvement Questionnaire) to assess self-directed and social approval components of task and ego involvement within an ideographic intervention. The study demonstrated reduced social approval ego involvement and increased self-directed task involvement within youth tennis players prior to ego-involving match situations.

Based on the criticisms levelled at existing measures of achievement goals outlined above, together with preliminary research (e.g., Harwood, 1997; Harwood & Swain, 2001, 2002) into self-directed and social approval components of task and ego orientations, the present study aimed to test a four-factor conceptual model (self-directed task, self-directed ego, social approval task, social approval ego) of achievement goal orientations in sport. Study One investigated preliminary factor validity via confirmatory factor analysis. Study Two replicated Study One and investigated scale development via further confirmatory factor analysis. It also examined concurrent validity via correlations with an existing measure of achievement goals, namely, the Perception of Success Questionnaire (POSQ; Roberts

et al., 1998). Finally, Study Two investigated alternative models in order to identify which models had the strongest factor structure and fit.

STUDY ONE

Method

Participants

Seven hundred and twenty athletes participated in the study. These comprised 308 male and 412 females with ages ranging from 13 to 45 years (Mean age = 17.6; SD= 3.52). Participants took part in a variety of competitive sports (e.g., Athletics, Badminton, Basketball, Football, Hockey, Lacrosse, Netball, Rugby, Swimming, and Volleyball) and included school, club, regional, national and international level athletes. The majority (56%) of the participants were part of National Governing Body high level youth sport performance camps. Verbal consent was obtained from all participants. Parental consent was also obtained for all participants under 18 years of age.

Materials

Goal Orientations. The Profile of Goal Involvement Questionnaire (PGIQ), devised by Harwood and Swain (2002), comprised of 12 items, with each of the four goal perspectives (i.e., self-directed task, self-directed ego, social approval task and social approval ego goals) represented by 3 items. In the present work, *Self-directed Task* involvement was defined as a sense of achievement based upon the internal recognition of improvement. For example, a performer might feel competent because of improvements in his/her ability. *Social Approval Task* involvement was defined as a sense of achievement based upon the external recognition by others of developments in skill and ability. For example, during training and competition an athlete may feel competent because he/she has shown coaches that he/she is improving his/her skills.

Self-directed Ego involvement was defined as a sense of achievement based upon the internal recognition of superiority over others. For example, an athlete may feel competent because he/she had experienced superiority over the opposition. Finally, *Social Approval Ego* involvement represents a sense of achievement based upon the external recognition of favourable social comparisons by others. For example, an athlete may feel competent because she has shown coaches, selectors, or team mates that she is superior to the opposition (see Harwood & Hardy, 2001; Harwood & Swain, 2002 for a full discussion).

Eighteen additional items were generated and vetted by three academic colleagues who had expertise in achievement goal research. This resulted in a pool of 30 items: 12 reflected Self-directed Task (e.g., 'master certain aspects of my game', 'perform to a level which reflects personal progress'); eight reflected Self-directed Ego (e.g., 'prove to myself that I am better than the opposition', 'reach standards that exceed those of the opposition'); four reflected Social Approval Task ('show others how well I can execute my skills', 'show others how I can get the best out of myself'); and six reflected Social Approval Ego (e.g., 'show other people my ability to beat the opposition', 'reinforce to others how my skills are superior to other competitors/opponents'). When replying to each item statement, participants responded to the stem 'For my sport in general, to feel successful and satisfied, it is important for me to…'. The term 'satisfied' was included in the stem to ensure that individuals who might not have been successful in their competition in terms of competitive outcome, but might have felt satisfied with regards to their performance, could relate to each item. Response options ranged, on a 7-point Likert scale, from 1 (not at all important) to 7 (extremely important). Responding to statements viewed as important/unimportant for securing internal feelings of success and satisfaction in

their sport was thought to be an appropriate way to access directly an individual's dispositional characteristics and schemas as well as the frequency of those characteristics.

Procedures

The author approached National Governing Bodies, clubs, and coaches to inform them of the study and gain permission to approach athletes to take part. Prior to completing the questionnaire, participants were informed about the nature of the study, signed a consent form (parental consent was also sought for participants under 18 years of age), and were informed that they were able to withdraw from the project at any time without penalty. Once consent was gained, a battery of questionnaires (including the revised PGIQ) was administered by the author or trained research assistants either before or after training sessions.

Data Analysis

At the preliminary analysis stage, 62 data sets were incomplete due to instances of missing or corrupted data within the questionnaire battery. They were removed. This left a 'clean', active sample of 720 for the CFA analysis. The factorial validity of the conceptual model was tested by analyses of covariance structures, using LISREL 8 (Joreskog & Sorbom, 1993). The researchers used CFA as a model-generating tool (Joreskog, 1993). Overall goodness of fit of models was tested using the Satorra-Bentler chi-square, Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI) (see Jaccard & Wan, 1996; Joreskog & Sorbom, 1993). In line with Hu and Bentler's (1999) recommendations, the criteria for evaluation of fit was a non-significant chi-square, NNFI and CFI should be close to 0.95, SRMR should be close to 0.8 and RMSEA values should be close to 0.06.

The sequential model testing procedure recommended by Joreskog (1993) was employed. This procedure tests single factor models to eliminate poorly defined items, then tests each factor paired with every other factor to eliminate ambiguous items that want to cross-load, and then tests the full model. This approach has many advantages over a single omnibus test of whole models, and has been employed successfully in sport/exercise contexts on a number of occasions in the past (Markland & Ingledew, 1997; Rees, Ingledew, & Hardy, 1999; Rees, Hardy, & Ingledew, 2000; Vlachopoulos, Karageorghis, & Terry, 2000). A specific advantage is that it is a rigorous test of convergent and discriminate validity of a measurement model (Markland & Ingledew, 1997).

Results

Single-Factor Models

For Self-directed Task (SDT) with all 12-items, fit statistics were poor [x^2 = 213.45 (p>.05), d.f = 54, RMSEA = .11, CFI = .87, SRMR = .06, NNFI = .84] and factor loadings ranged from 0.57 to 0.71. After analysis of standardised residuals and modification indices, four items were removed. The fit statistics for SDT with the four items removed were adequate [x^2 = 11.11 (p<.05), d.f = 20, RMSEA = .06, CFI = .98, SRMR = .03, NNFI = .97], except for the significant chi-square, which is a common problem with large sample sizes (Joreskog & Sorbom, 1993). For Self-directed Ego (SDE) with all 8 items, fit statistics were less than adequate [x^2 = 66.84 (p<.05), d.f = 20, RMSEA = .10, CFI = .95, SRMR = .04, NNFI = .94] and factor loading ranged from 0.64 to 0.84. After analysis of standardised residuals and modification indices, two items were removed. The fit statistics for SDE with the two items removed were generally good [x^2 = 35.18 (p<.05), d.f = 9, RMSEA = .06, CFI = .99, SRMR = .02, NNFI = .98]. For Social Approval Task (SAT) with all 4 items, the

fit statistics were generally good [x^2 = 1.32 (p = .52), d.f = 2, RMSEA = .07, CFI = 1.00, SRMR = .01, NNFI = 1.01], and factor loadings ranged from 0.64 to 0.77. No items were removed at this stage. For Social Approval Ego (SAE) with 6 items, the fit statistics were generally good [x^2 = 35.19 (p<.05), d.f = 9, RMSEA = .01, CFI = .95, SRMR = .04, NNFI = .95], and factor loadings ranged from 0.72 to 0.88. After analysis of the modification indices, two items were removed. The fit for SAE with these items removed was perfect.

Two-Factor Models

The worst initial fit statistics for the two-factor models were x^2 = 176.55 (p<.05), d.f = 53, RMSEA = .07, CFI = .98, SRMR = .03, and NNFI = .95. All other initial fit statistics for the two-factor models were better than this. Due to high modification indices and standardised residuals, four items were removed from SDT and two items were removed from SDE. The final fit statistics for the two-factor models: SDT with SAT [x^2 = 66.13 (p<.05), 13, RMSEA = .06, CFI = .97, SRMR = .03, NNFI = .96]; SDT with SAE [x^2 = 37.73 (p<.05), d.f = 13, RMSEA = .06, CFI = .99, SRMR = .04, NNFI =.98]; SDT with SDE [x^2 = 68.68 (p<.05), d.f = 26, RMSEA = .04, CFI = .99, SRMR = .03, NNFI = .99]; SDE with SAE [x^2 = 43.79 (p<.05), d.f = 13, RMSEA = .06, CFI = .99, SRMR = .02, NNFI = .99]; SDE with SAT [x^2 = 66.49 (p<.05), d.f = 19, RMSEA = .06, CFI = .98, SRMR = .03, NNFI = .97]; and SAT with SAE [x^2 = 68.28 (p<.05), d.f = 13, RMSEA = .08, CFI = .98, SRMR = .03, NNFI = .97].

Full Model

Fit statistics for the full 16-item four-factor model were $x^2 = 288.90$ ($p<.05$), d.f = 98, RMSEA = .05, CFI = .97, SRMR = .03, and NNFI = .96. Despite the RMSEA being low enough and the CFI being high enough to feel confident about the fit of the model to the data, the χ^2 was significant, leading to some caution in accepting the model. However, as previously remarked, this is a common problem with large samples (Joreskog & Sorbom, 1993). The chi-square is significant, so with regards to the exact fit, the model is rejected. However, the other fit statistics indicate that the model might hold approximately in the population (Brown & Cudeck, 1993; Joreskog, 2005). Completely standardised factor loadings and factor-factor correlations for the full four-factor model are shown in Table 1.

Inter-correlations between achievement goals

Pearson's correlations revealed that the four factors were significantly and positively correlated to each other. Correlations ranged from .25 (SDT & SAE) to .77 (SAT & SAE). These factor correlations are also presented in Table 1.

Discussion

Utilising CFA as a model generating tool and employing Joreskog's (1993) sequential model testing procedure, a four-factor model emerged with generally good fit statistics. From the initial 30 items, 14 items were removed due to high error measurements, high modification indices, or standardised residuals. Measurement error can be random (i.e., athletes misinterpreting some items) or systematic (i.e., social desirability) (Jaccard & Wan, 1996). This resulted in four items for each of the four factors.

There are a number of limitations to Study One. Having only 30 items restricted the researchers' ability to retain a substantial number of items with which to measure each subscale. This was especially the case for the Social Approval Task factor, which had only four items to begin with. The moderate to quite high correlations between the factors indicates that the four factors share a fair amount of common variance. Furthermore, no evidence has been presented regarding concurrent validity of the four-factor model. Finally, the achievement goal items that were used formed part of a much larger battery of questionnaires that participants were required to complete. The size of this battery may have resulted in participants becoming fatigued or bored when completing the questionnaires, which may have contaminated the data.

In light of the above limitations, and the need to confirm the structural validity of the model tested, a second study was performed to replicate and extend the first study by including additional items for the four hypothesised goal orientation factors. The resulting inventory was administered to a large sample of participants, together with Roberts *et al.* (1998) Perceptions of Success Questionnaire (POSQ), in order to assess concurrent validity.

Table 1
Completely Standardised Solution for the Full Four-Factor Model (Study One)

Items	Factors 1	2	3	4
Self-Directed Ego				
Beat my opponent/the opposition	.80			
Put in a more effective performance than the other competitors/opposition	.74			
Perform to a higher level than those who are competing against me	.83			
Prove to myself that I have the skills that are superior to the opposition	.82			
Social Approval Task				
Show other people how well I can execute my skills		.67		
Show others how I can get the best out of myself		.62		
Show others how disciplined and focused I am on improving my performance		.67		
Show other that I can produce a high level of personal skill		.81		
Self-directed Task				
Make progress in the execution of my skills			.65	
Perform to a level which reflects personal progress			.70	
Prove to myself that I have gained in ability			.67	
Give my all to perform to a high level			.71	
Social Approval Ego				
Show other people my ability to beat the opponent/opposition				.83
Prove to others that I am superior to the opposition				.84
Prove to other people that I have greater ability and skill than my opposition				.87
Show others that my strengths as a performer are greater than the opposition				.85
Factor	Factor-factor correlations			
1. Self-Directed Ego	1.00			
2. Social Approval Task	.58	1.00		
3. Self-Directed Task	.39	.42	1.00	
4. Social Approval Ego	.76	.77	.25	1.00

STUDY TWO

Methods

Participants

Six hundred and seventy four athletes participated in the study. This sample comprised of 234 female and 440 male athletes with ages ranging from 16 to 43 (Mean age = 22.6; SD= 7.42). Participants took part in a variety of competitive sports (e.g., Athletics, Badminton, Basketball, Football, Hockey, Netball, Rugby, Swimming, Tae Kwan do and Volleyball) and included school, club, regional, national and international level athletes.

Materials

Goal Orientations. The revised PGIQ, comprising the 16 items from Study One (chapter 2), with four items for each of the four goal perspectives (i.e., Self-directed Task, Self-directed Ego, Social Approval Task and Social Approval Ego goals), was utilised as a base for further scale development. Fifty-one additional items were generated by the author and vetted by three other researchers who had expertise in achievement goal research. When replying to each item statement, participants responded to the stem 'I feel successful in my sport if...'. The stem was changed from Study One (chapter 2) because discussions with participants and colleagues lead us to believe the stem was unnecessarily complex and that the inclusion of the phrase 'and satisfied' could confound the measurement of conceptions of success. Response options ranged, on a 6-point Likert scale, from 1 (never true) to 6 (always true). The scale was changed from Study One in order to match the change in stem.

The Perceptions of Success Questionnaire (POSQ; Roberts *et al.*, 1998) was used in order to explore the concurrent validity of the Profile of Goal Orientation Questionnaire (PGOQ). The POSQ is a twelve-item measure of task and ego

orientation with six item statements comprising each subscale. Participants respond to the stem: 'When playing sport, I feel most successful when...'. Items on the task scale include 'I overcome difficulties' and 'I perform to the best of my ability', while items on the ego scale include 'I win' and 'I outperform my opponents'. Participants indicate their levels of agreement along a five-item Likert scale ranging from '1' (strongly disagree) to '5' (strongly agree). The POSQ (adult and children versions) has undergone confirmatory factor analysis (Roberts *et al.*, 1998) and the fit statistics and factor loadings were reported as adequate (children's version; x^2/d.f = 2.5, RMSR = 0.07, Tucker-Lewis GFI = 0.90, factor loadings ranged from 0.59 to 0.83; adult version; x^2/d.f = 2.8, RMSR = 0.09, Tucker-Lewis GFI = 0.90, factor loadings ranged from 0.50 to 0.89). However, it is worth noting that only one of the Hu and Bentler's (1999) fit indices was reported and the value obtained for this with the adult sample was rather high. Both the task and ego subscales of the POSQ have demonstrated acceptable internal consistency across a variety of samples with mean alpha coefficients of 0.81 and 0.82 respectively (Duda & Whitehead, 1998). Coefficient alphas in the present study also reached satisfactory levels (task= .84; ego= .89).

Procedure

The author approached clubs and coaches to inform them of the study and gain permission to approach athletes to take part. Prior to completing the questionnaires, participants were informed of the nature of the study, signed a consent form (parental consent was also sought for participants under 18 years of age), and were informed that they were able to withdraw from the project at any time without penalty. Once consent was gained, the questionnaire (or both questionnaires for the concurrent validity sample) was administered by the author or trained research assistants either

before or after training sessions. All participants completed the PGOQ, and a sub-sample of 211 participants completed both the PGOQ and the POSQ.

Data Analysis

At the preliminary analysis stage, 12 data sets were removed because they were incomplete due to instances of missing or corrupted data within the questionnaire battery. This left a sample of 674 athletes for the CFA analysis and 211 athletes for concurrent analysis. The factorial validity of the conceptual model was tested by analyses of covariance structures, using LISREL 8 (Joreskog & Sorbom, 1993), together with the same analytical strategy and fit criteria as used in Study One.

A confirmatory factor analysis was also conducted on the POSQ (see Table 3), which showed that the fit of the data to the two-factor model was poor [$x^2 = 25.44$ ($p < .05$), RMSEA = .08, CFI = .93, SRMR = .06, NNFI = .92]. This is in line with research by Kavussanu and Ntoumanis (2003) who carried out a CFA on the POSQ with a sample of 221 college athletes and found a poor fit of their data to the two-factor model [RMSEA = .11, CFI = .83, SRMR = .11, NNFI = .78].

The concurrent validity of the final four-factor measure model was examined by computing Pearson's correlation coefficients for the four subscales of the PGOQ with the task and ego subscales of the POSQ.

Results

Single factors

Fit statistics for initial and final single factor models are displayed in Table 2. For SDT (17-items), the initial fit statistics were inadequate and factor loadings ranged from 0.53 to 0.92. After analysis of standardised residuals and modification indices, seven items were removed. Fit statistics for SDT containing the remaining 10 items were generally good. For SDE (21-items), the initial fit statistics were also inadequate

and factor loadings ranged from 0.48 to 0.89. After analysis of standardised residuals and modification indices, 14 items were removed. Fit statistics for SDE with the remaining 7 items were excellent. For SAT (14-items), the initial fit statistics were less than adequate and factor loadings ranged from 0.41 to 0.93. After analysis of standardised residuals and modification indices, eight items were removed. Fit statistics for SAT with the remaining 6 items were generally very good. For SAE (15-items), the initial fit statistics were also inadequate and factor loadings ranged from 0.40 to 0.93. After analysis of the modification indices, seven items were removed. Fit statistics for SAE with remaining 8 items were excellent.

Table 2
Fit Measures for Initial and Final Single Factors in Study Two

Scale	χ^2	d.f	$p(\chi^2)$	RMSEA	CFI	NNFI	SRMR
Single Factor – Initial							
Self-directed Task	524.20	199	0.0	0.12	0.95	0.94	0.05
Self-directed Ego	1008.69	189	0.0	0.13	0.95	0.94	0.04
Social Approval Task	407.44	77	0.0	0.08	0.97	0.97	0.04
Social Approval Ego	352.83	90	0.0	0.12	0.94	0.94	0.03
Single Factor – Final							
Self-directed Task	113.66	35	0.0	0.06	0.98	0.97	0.04
Self-directed Ego	14.59	14	0.0	0.01	0.99	0.99	0.01
Social Approval Task	23.27	9	0.0	0.05	0.99	0.99	0.02
Social Approval Ego	31.18	20	0.0	0.03	0.99	0.99	0.01

Paired factors

The initial fit statistics for the paired factors are displayed in Table 3. With the exception of SDT - SAE and SAT - SAE, the fits were generally good, although the x^2 was always significant. The two-factor model for SDT and SDE revealed that four items had high modification indices. These items were removed. The two-factor model with SDT and SAT revealed that two items had high modification indices. These two items were removed. The two-factor model with SDT and SAE revealed that one item had a high modification index. This item was removed. Despite SAT and SAE having poor initial fit statistics, items were not removed from this pair due to our desire not to reduce single factors to below four items at this stage. Final fit statistics for the two-factor models are also shown in Table 3.

Table 3
Fit Measures for Initial and Final Paired Factors in Study Two

Scale	χ^2	d.f	$p(\chi^2)$	RMSEA	CFI	NNFI	SRMR
Paired Factors - Initial							
Self-directed Task and Self-directed Ego	419.71	118	0.0	0.06	0.97	0.97	0.06
Self-directed Task and Social Approval Task	400.98	103	0.0	0.07	0.97	0.97	0.06
Self-directed Task and Social Approval Ego	577.99	134	0.0	0.07	0.95	0.95	0.14
Self-directed Ego and Social Approval Task	237.32	64	0.0	0.06	0.99	0.98	0.04
Self-directed Ego and Social Approval Ego	275.54	89	0.0	0.06	0.99	0.99	0.03
Social Approval Task and Social Approval Ego	452.73	76	0.0	0.09	0.98	0.97	0.05
Paired Factors - Final							
Self-directed Task and Self-directed Ego	211.13	76	0.0	0.05	0.97	0.98	0.06
Self-directed Task and Social Approval Task	155.76	53	0.0	0.05	0.97	0.98	0.05
Self-directed Task and Social Approval Ego	275.52	76	0.0	0.05	0.98	0.98	0.06
Self-directed Ego and Social Approval Task	187.95	53	0.0	0.06	0.98	0.99	0.03
Self-directed Ego and Social Approval Ego	226.14	76	0.0	0.05	0.99	0.99	0.03
Social Approval Task and Social Approval Ego	227.06	53	0.0	0.07	0.98	0.99	0.03

Full model

The fit statistics for the 24-item four-factor model were $x^2 = 535.92$ ($p<.05$), d.f = 172, RMSEA = .06, CFI = .98, SRMR = .06, NNFI = .98. Four items had high modification indices and were removed.

Fit statistics for the final 20-item four-factor model are shown in Table 4. The RMSEA (0.05) and SRMR (0.06) were both low enough and the NNFI (0.98) and CFI (0.98) were both high enough to feel confident about the fit of the model to the data. The chi-square is significant, so with regards to the exact fit, the model is rejected. However, the other fit statistics indicate that the model might hold approximately in the population (Brown & Cudeck, 1993; Joreskog, 2005). Completely standardised factor loadings for the full four-factor model are shown in Table 5 and factor-factor correlations are shown in Table 6.

The fit statistics for the final 6-item single-factor solution for SDT were $x^2 = 13.7$ ($p<.05$), d.f = 28, RMSEA = .06, CFI = .98, SRMR = .02, NNFI = .99. The fit statistics for the final 5-item single factor solution for SDE was $x^2 = 4.84$ ($p<.05$), d.f = 11, RMSEA = .02, CFI = 1.00, SRMR = .01, NNFI = 1.00. The fit statistics for the final 5-item single factor solution for SAE were $x^2 = 9.4$ ($p<.05$), d.f = 14, RMSEA = .04, CFI = .99, SRMR = .01, NNFI = 1.00. The fit statistics for the final 4-item single factor solution for SAT were $x^2 = 10.44$ ($p<.05$), d.f = 6, RMSEA = .06, CFI = .99, SRMR = .02, NNFI = .98.

Table 4
Fit Measures for the Final Four-Factors, POSQ and Alternative Models in Study Two

Scale	χ^2	d.f	$p(\chi^2)$	RMSEA	CFI	NNFI	SRMR
Final four-factor model (20 items)	475.44	164	0.0	0.05	0.98	0.98	0.06
POSQ	112.50	53	0.0	0.08	0.93	0.92	0.06
Alternative models							
SDT, SDE, and (SAT + SAE)	680.80	167	0.0	0.07	0.98	0.97	0.07
SAT, SDT, and (SDE + SAE)	613.89	167	0.0	0.06	0.98	0.97	0.06
SDT and (SDE + SAT + SAE)	745.54	169	0.0	0.07	0.97	0.97	0.07
(SDT + SAT) and (SDE + SAE)	1832.19	169	0.0	0.12	0.94	0.92	0.15

Alternative Models

There were very high factor-factor correlations between Social Approval Ego, Self-directed Ego and Social Approval Task (see Table 6). Consequently, four alternative models were explored to see if they had a better fit than the hypothesised model; a) Self-directed Task, Self-directed Ego, and a single social approval factor comprising all the Social Approval Task and Social Approval Ego items; b) Self-directed Task, Social Approval Task, and a single ego factor comprising all the Self-directed Ego and Social Approval Ego items; c) Self-directed Task and a single ego/social approval factor comprising all the Self-directed Ego, Social Approval Ego, and Social Approval Task items; d) a Task factor which comprised of Self-directed Task and Social Approval Task with an Ego factor which comprised of Self-directed Ego and Social Approval Task. As can be seen in Table 3, the model that most closely reflects the more traditional model of achievement goals [task (self-directed) and ego (self-directed + social approval)] had a very poor fit. While only one other alternative model had as bad a fit, neither did any of them fit as well as the hypothesised four-factor model.

Concurrent validity

Correlations between the four new conceptual factors and the Task and Ego subscales of the original and revised version (see below) of POSQ (Roberts *et al.*, 1998) are shown in Table 6. As expected, there was no significant relationship between Self-directed Task and POSQ Ego (r=-.05), Self-directed Ego and POSQ Task (r=-.10), or Social Approval Ego and POSQ Task (r= -.12). Those factors that were expected to correlate did correlate, namely: Self-directed Task and POSQ Task; Self-directed Ego and POSQ Ego; and Social Approval Ego and POSQ Ego. However, Social Approval Task did not correlate with POSQ Task, but did correlate with POSQ Ego (r=.39). This finding was unexpected.

Because the CFA that had been conducted on the POSQ demonstrated a poor fit, four items were removed (items 1, 4, 11 and 12) due to high-standardised residuals and modification indices. This resulted in a two-factor model with four items relating to task and four items relating to ego goal orientations, with excellent fit statistics [x^2 = 24.01 (p<.05),RMSEA = 0.05, NNFI = 0.97, CFI = 0.98, SRMR = 0.05]. Utilising this 8-item model, correlations with the PGOQ factors were then calculated and are shown in Table 6. As can be seen the results remain very similar to the original results.

Alpha Levels

Alpha levels for the four new conceptual factors were generated and were generally very good (Nunnally, 1978) (see Table 6): Self-directed task (.76); Self-directed Ego (.88); Social Approval Task (.84); and Social Approval Ego (.92).

Table 5
Completely Standardised Solution for the Full Four-Factor Model (Study Two)

Items	Factors			
	1	2	3	4
Self-directed Ego				
I have fewer weaknesses than other competitors	0.67			
I am more skilled than my opponents	0.85			
I prove to myself that I have skills that are superior to the opposition	0.79			
I make fewer mistakes than other competitors	0.77			
I achieve more than others	0.79			
Self-directed Task				
I perform to the best of my ability		0.33		
I correct my own mistakes or weaknesses		0.59		
I improve myself		0.75		
I better my standards		0.81		
I put in a high standard of personal performance		0.78		
I perform to a level that reflects personal improvement		0.75		
Social Approval Ego				
I show other people that I am more effective than my opponents			0.83	
I show others that I can beat other performers			0.79	
I show others that my strengths as a performer are greater than the opposition			0.86	
I prove to others that I am superior to the opposition			0.86	
I show other people that I can out perform other performers			0.85	
Social Approval Task				
I impress others by mastering something new or difficult				0.61
I impress others by the quality of my individual performance				0.81
I show others that I can produce a high level of personal skill				0.75
I execute my skills to a level that others would expect of me				0.80

Table 6

Correlations and Alpha Levels for the Four-Factors of PGOQ, the Two Factors of POSQ and the Two Revised Factors of POSQ (Study Two)

	Factor	Factor-Factor correlations								
		SDE	SDT	SAE	SAT	POSQT	POSQE	POSQT-R	POSQE-R	Alpha
1.	Self-directed Ego	1.00						-.09	.50**	.88
2.	Self-directed Task	0.48**	1.00					.47**	.05	.76
3.	Social Approval Ego	0.93**	0.32**	1.00				-.10	.49**	.92
4.	Social Approval Task	0.88**	0.57**	0.92**	1.00			.10	.33**	.84
5.	POSQ Task	-.10	.43**	-.12	.09	1.00				.84
6.	POSQ Ego	.57**	-.05	.59**	.39**	-.07	1.00			.89

Note: ** = correlation is significant at the 0.01 level

Discussion

Utilising CFA as a model generating tool and employing the sequential model testing procedure, fit statistics for the final 20-item four-factor model were generally very good. The final model had five items relating to Self-directed Ego, five items relating to Social Approval Ego, six items relating to Self-directed Task, and four items relating to Social Approval Task (see Appendix for 20-item questionnaire). Four alternative models (based on high factor correlations) were also tested. However, none of these alternative models fitted as well as the hypothesised four-factor model (see Table 4). Furthermore, the alternative model that was based on the traditional two factor task and ego orientation conceptualisation fitted poorly.

A CFA was also performed on the two-factor model of POSQ, which showed a poor fit (see Table 4). Four items were removed which improved the fit considerably. One of these items ('I work hard'), as previously discussed by Hardy (1997, 1998) and Harwood, Hardy and Swain (2000), measures a hypothesised behavioural correlate of a Task Goal Orientation, namely effort. In a CFA of the POSQ, performed by Kavussanu and Ntoumanis (2003), the item 'I work hard' was also removed due to high modification indices and standardised residuals. Two items ('I beat other people' and 'I show other people I am the best') may have shown a poor fit due to the ambiguity of the term 'others'. Athletes could interpret others to be teammates, coaches, parents, or the opposition. In the current measure (PGOQ), 'others' are defined in the instruction set as those involved in the athlete's sport involvement, while 'opposition' or 'other performers' are explicitly labelled in the relevant items. However, further clarification of the term 'others' within the current measure is discussed in greater detail below.

The concurrent validity results confirmed that Self-directed Task was related to POSQ Task and Self-directed Ego was related to POSQ Ego. However, taken together with the factor-factor correlations, the rest of the concurrent validity correlations suggest that Social Approval Task and Social Approval Ego Orientations are closely related to POSQ Ego Orientation (cf. Nicholls *et al.*, 1985; Nicholls *et al.*, 1990; and Urden *et al.*, 1992). These relationships remain the same with the revised 4-item POSQ factors.

General Discussion

The purpose of the two studies reported in this paper was to examine an alternative model of goal orientations comprising four goal orientations rather than the traditional two. The results suggest that whilst a four-factor model does fit the data, the correlations between the factors could be taken to indicate that a two-factor task and ego model might after all be the most parsimonious fit. However, alternative models that were tested in which the items were loaded on task and ego orientation factors did not fit the data quite as well as the four-factor model.

The factor-factor correlations were high in Study One, but because of the reservations pointed out in the Discussion of that study, the authors actually have more confidence in the correlations obtained from Study Two. One possible explanation for the high factor correlations could be that when athletes were completing the social approval items in the PGOQ, they focused on 'others' as competitors/opponents, instead of as coaches/parents/team mates, etc. What may be required is a clearer definition of who the 'others' are in a Self-directed Ego (competitors) versus a Social Approval Task/Ego (coach/parent/team-mate) context. However, whether or not this would clarify the ambiguity in the present findings remains to be seen.

It is also possible that, despite the high factor-factor correlations, the four factor model may prove capable of answering questions that the traditional two factor model is incapable of answering; for example, are performers who are high on social approval task and/or social approval ego orientation more likely to adjust their goal involvement states in line with prevailing motivational climates than performers who are low on social approval task and ego orientations?

Some readers will no doubt interpret the results presented here as arguing in favour of abandoning Harwood's (1997) and Harwood and Swain's (2001, 2002) four factor model in favour of the traditional two factor model. However, the authors would argue that this is perhaps a little premature on several grounds; a) although the two factor model has proven utility, the criticisms that have been levelled at the two primary measures of goal orientations (Hardy, 1997, 1998; Harwood *et al.,* 2000; Harwood & Hardy, 2001) remain a challenge, as supported by the poorer fits of POSQ and alternative models 3 and 4 in the present study. Furthermore, these concerns are reinforced by the rather moderate correlations obtained between PGOQ Self-directed Task and POSQ Task, and between PGOQ Self-directed Ego and POSQ Ego in the current study. These correlations may be due to the fact that items within the PGOQ are not confounded by hypothesised behavioural correlates of achievement goal orientations; b) even if the four factor model eventually proves to be inaccurate, the possibility remains that other models including social variables (e.g., Allen, 2003, 2005; Stuntz & Weiss, 2003) have stronger predictive validity than the two dimensional model; and c) it is entirely plausible that participants do confuse who 'other' refers to when completing the PGOQ, especially if

they have a strong ego orientation, and it would be advisable to resolve this issue before abandoning the four factor model.

Future research should focus on: 1) clarifying the strong correlations that appear to exist between Ego and Social Approval goal orientations; 2) examine situations in which social orientations might play a key role; and 3) purify the current measures of task and ego orientation so that one can at least have confidence in the (possibly limited range of) goal orientations that they measure.

CHAPTER 3

INVESTIGATING THE RELATIONSHIP BETWEEN ACHIEVEMENT GOALS AND PROCESS GOALS IN RUGBY UNION PLAYERS

Abstract

The present study investigated the relationship between achievement goal orientations and process goals in a sample of Rugby Union players. Participants were aged 14-45 years (M $\pm$ SD: 24.31 $\pm$ 6.02) and ranged from Club to National level. There were 78 males and 72 females with a mean of 9.17 years experience. Achievement goals were measured using an instrument developed by Harwood, Wilson, and Hardy (2002: chapter 2) that assesses Self-Directed Task, Self-Directed Ego, Social Approval Task, and Social Approval Ego Goal Orientations. Process goals were measured using a slightly adapted version of an instrument developed by Harwood (1997). Self-Directed Task (7), Self-directed Ego (5), Social Approval Task (6), and Social Approval Ego (2) had varying numbers of significant positive correlations with process goal variables. Stepwise regression analysis revealed that Self-directed Task was the sole significant predictor for five of the seven process goal variables (β = .30 to .60). Social Approval Ego had a negative relationship with two process goal variables. Those significant others who influence the achievement context should encourage high levels of Self-directed Task and discourage high levels of Social Approval Ego goal orientation to promote a focus upon the processes of performance.

One issue that was at the forefront of a debate within the achievement goal literature between Hardy (1997, 1998) and Duda (1997) is the relationship between achievement goals and the actual goals performers set. Duda (1992) has argued that ego-orientated individuals tend to be more outcome focused. However, Hardy (1997) and Harwood and Swain (2001, 2002) proposed that ego-orientated individuals would also set process goals if this served to fulfil their achievement orientation. From an applied perspective, this is an important issue to clarify for those with the potential to influence the achievement context. The present paper examines the relationship between achievement goals and process goals in a sample of rugby union players.

The concept of ability is central to achievement goal theory. According to Nicholls (1989), individuals engage in achievement contexts to maximize their perceptions of competence. Achievement goal orientations (Duda, 1992; Nicholls, 1989) have been categorized into two distinct goals, task and ego. Performers are *task oriented* when they base their perceptions of competence on personal improvements. For example, a task-oriented athlete will feel successful if they achieve a personal best time. Athletes are *ego oriented* when they formulate their perceptions of competence by comparing their own ability with that of others. For example, an ego-oriented athlete will feel successful if s/he beats his or her opponent. Recent criticisms by Hardy (1997, 1998) and Harwood, Hardy and Swain (2000) of the existing conceptualization and measurement of achievement goals have led to a re-conceptualisation of achievement behaviour. As a result of this re-conceptualization, Harwood, Wilson and Hardy (2002: chapter 2) and Wilson, Harwood and Hardy (in preparation: chapter 2) explored a four-goal model of achievement goals using the Profile of Goal Orientation Questionnaire

(PGOQ). This questionnaire was developed in order to ensure that: (a) each item reflected only the conceptualization of the construct in question; and (b) social approval orientations within the sport environment could be considered.

Harwood *et al.*'s (2002) model relied heavily on Harwood's (1997) and Harwood and Swain's (2001, 2002) work. In a qualitative study, Harwood and Swain (2001) concluded that young tennis players defined success in task and ego terms for both self-directed and socially driven reasons. In a follow-up intervention study, Harwood and Swain (2002) assessed social approval and self-directed components of task and ego involvement and were able to reduce social approval ego involvement and increase self-directed task involvement prior to ego-involving match situations. In Harwood *et al.*'s (2002: chapter 2) model, *self-directed task* involvement was defined as a sense of achievement based upon the internal recognition of improvement. For example, a performer will feel competent when they experience improvements in their ability. *Social approval task* involvement represents a sense of achievement based upon the external recognition by others of improvements in skills and ability. For example, during training and competition an athlete may feel competent when they show coaches that they are improving their skills. *Self-directed ego* involvement was defined as a sense of achievement based upon the internal recognition of superiority over others. For example, an athlete may feel competent when they experience superiority over the opposition. Finally, *social approval ego* involvement represents a sense of achievement based upon the external recognition of favourable social comparisons by others. For example, an athlete may gain a sense of achievement by showing coaches, selectors, or team mates that he/she is superior to the opposition.

A study by Stuntz and Weiss (2003) investigated the influence of social goal orientations, in addition to task and ego goal orientations, and peers on unsportsmanlike play. Utilizing a three-factor model of achievement goals, Stuntz and Weiss (2003) added a social goal factor to the two-factor Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992). They did this by developing an additional 15 items to measure social goals (friendship, peer acceptance and coach praise). Factor analysis of all 28 items revealed five distinct factors, with social goals being distinguishable from task and ego goals. The emergence of separate social goal factors is in line with past empirical research that has suggested that social goal orientations and social relationships are evident when athletes conceptualize success (Allen, 2003, 2005; Ewing, 1981; Hayashi, 1996; Jarvinen & Nicholls, 1996; Lewthwaite, 1990; Lewthwaite & Piparo, 1993; Schilling & Hayashi, 2001; Whitehead, 1995).

In comparison to previous measures of achievement goals (e.g., the Task and Ego Orientation in Sport Questionnaire, TEOSQ; Duda and Nicholls, 1992; and the Perceptions of Success Questionnaire, POSQ; Roberts, Treasure, & Balague, 1998), the four-goal model of achievement goals is more competition specific, does not measure hypothesized behavioural correlates of the goal orientation (e.g., effort and fun), and includes social approval as a factor that is relevant to most sporting contexts (influence of parents, coaches, selectors and opposition; cf. Stuntz & Weiss, 2003). Consequently, the PGOQ was utilised in the present study.

Previous research has investigated the effects of goal involvement on a number of performance-related variables in sport. Papaioannou and Kouli (1999) showed that an

ego-involving climate led to higher reported levels of somatic anxiety and lower levels of self-confidence than a task-involving climate. Theeboom, De Knop and Weiss (1995) showed that children participating in a summer school program who were in a task-involving climate exhibited better motor skills than children in an ego-involving climate. Goudas, Fox, Biddle and Armstrong (1992) showed that individuals who were high in both task and ego orientation were more likely to perform well than individuals who were low in task orientation, or low in both task and ego orientation.

Within the goal setting literature, Hardy and Nelson (1988) distinguished three different types of goals. *Outcome goals* focus on the end point of an event; for example, a tennis player may want to win a match. *Performance goals* specify end products of performance, but are usually expressed in terms of personal achievement; for example, the same player may want to achieve a 90% success rate for his/her serve (i.e., less than 10% double faults). *Process goals* specify the processes in which the performer wants to engage in order to perform satisfactorily (however that is defined); for example, the same athlete may want to always hit through the ball on their second serve. Burton (1989, 1992, 1993) showed that swimmers who were trained to set performance-oriented goals demonstrated higher perceived ability and felt more successful than swimmers who were untrained in goal setting. Kingston and Hardy (1997) showed that a process-oriented goal-setting training group demonstrated significant improvements in the use of psychological processes thought to support effective performance (e.g., anxiety control and self-efficacy) compared to athletes who were only trained to set performance goals. Jones and Hanton (1996) showed that high-level performers set more than one type of goal and nearly half of their sample set all three types.

Previous research has not conclusively examined the relationship between goal orientations and actual goals performers set. Research by Zimmerman and Kitsantas (1996) showed ego orientations to have strong links with outcome goals, whilst research by a variety of authors has shown ego orientations to be related to maladaptive motivational and emotional variables, such as reduced effort and persistence (Duda, Chi, Newton, Walling, & Catley, 1995; Papaioannou & Kouli, 1999). Duda, Olson and Templin (1991) also suggested that task-oriented individuals were more concerned with the intrinsic facets or processes of a skill/experience; however, no empirical evidence was presented to support this suggestion. Finally, Zimmerman and Kitsantas (1996) suggested that process goals may help performers improve themselves and should be considered conducive to a task-involving climate, while competitive or outcome goals create an ego-involving atmosphere, which they appeared to suggest was incompatible with a process focus. Duda (1992) has stated, "it is logical that an ego-oriented individual would tend to focus on competitive outcomes" (p. 63). However, Hardy (1997) argued that it was not logical to reason that highly ego-oriented individuals would not also set process goals if it served to satisfy their achievement orientation. In conclusion, Hardy (1997) suggested that there is no *a priori* reason why an individual with a low ego orientation should maintain a stronger focus upon the process of performing than an individual with a high ego orientation.

Based on the above findings, some applied sport psychology consultants appear to have drawn the conclusion that performers should be encouraged to set performance goals *instead* of outcome goals (Burton, 1992, 1993; Duda *et al.*, 1991; Weinberg, Bruya, Longino & Jackson, 1988). This conclusion appears to be based on the premise that a

high ego involvement, and accompanying outcome goals, are detrimental to performance and may lead to maladaptive behaviour. However, there is little evidence to suggest that ego-involvement *per se* has a detrimental effect on performance. Rather, ego involvement has been shown to be damaging to motivational variables underpinning performance only when it is combined with low perceptions of competence (Duda *et al.*, 1995; Papaioannou & Kouli, 1999; Theebom, De Knop & Weiss, 1995). Furthermore, several researchers have suggested that high task orientations may offset the potentially negative effects of high ego orientations when combined with low levels of perceived competence (e.g., Hodge & Petlichkoff, 2000).

Therefore, the aim of the present research was to investigate the relationship between achievement goal orientations and process goals in a sample of rugby union players. It was predicted that self-directed task, self-directed ego, and social approval task orientations would all be positively correlated with the use of process goals. It was predicted that social approval ego would have a moderate to low negative correlation with the use of process goals, as the individual who has a high social approval ego orientation focuses on showing others superiority over the opposition, which may distract them from focusing on the process of their own performance. It was also predicted that self-directed task orientation would be the strongest predictor of the use of process goals, but that self-directed ego orientation would also predict a strong process focus.

Method

Participants

One hundred and fifty rugby union players participated in the study. Participants' ages ranged from 14 to 45 years ($M \pm SD$: 24.31 ± 6.02) and the sample included amateur club

(n=48), professional club (n=8), county (n=60), national age group (n=16) and national level (n=18) players. There were 78 males and 72 females with a mean of 9.17 years experience.

Procedure

The author, to secure participation in the project, contacted Club/National coaches. Once coaches agreed that players could participate, a researcher attended a training session and the players completed all questionnaires either before or after the session. Players were instructed to answer each question with regard to the last match in which they had played. Each player was told that the researchers were investigating the motivation of rugby players and were informed that they could withdraw from the study at any stage without penalty. Players completed the questionnaires once they had given their consent to participate in the study (parental consent for participants under 18 years of age).

Materials

Goal Orientations. Achievement goals were measured using the Profile of Goal Orientation Questionnaire (PGOQ) developed by Harwood *et al.* (2002: chapter 2, study one). In order to assess the structural validity of the PGOQ, Harwood *et al.* (2002: chapter 2) had a sample of 720 athletes (308 male and 412 females) with ages ranging from 13 to 45 years complete a 30-item version of the PGOQ. The sequential approach to model testing advocated by Jöreskog (1993) and Biddle, Markland, Gilbourne, Chatzisarantis, and Sparkes (2001) was utilized. Using this approach, confirmatory factor analysis resulted in 16 items being retained. These items reflected Self-Directed Task (SDT; 4-items), Self-Directed Ego (SDE; 4-items), Social Approval Task (SAT; 4-items) and Social Approval Ego (SAE; 4-items) involvement. The fit statistics obtained by

Harwood *et al.* (2002: chapter 2) for the 16-item model were good (x^2 = 59.8 *(p<.05)*; RMSEA = 0.05; NNFI = 0.96; CFI = 0.97; SRMR = 0.03). A CFA was not performed on the current sample because it was a subset of the sample used in the Harwood *et al.* (2002: chapter 2) study. Reliability analyses from the Harwood *et al.* (2002: chapter 2) study revealed that all four subscales reached acceptable levels (.70; Nunnally, 1978); Self-directed Task = .82, Self-directed Ego = .77, Social Approval Task = .78 and Social Approval Ego = .90.

When completing the PGOQ, participants were asked 'For sport in general, to feel successful and satisfied, it is important for me to…'. Items included 'make progress in the execution of my skills' (SDT), 'perform to a higher level than those who are competing against me' (SDE), 'show other people how well I can execute my skills' (SAT), 'show other people my ability to beat the opponent/opposition' (SAE). Response options ranged on a 7-point Likert scale from 1 = not at all important; 4 = moderately important; and 7 = extremely important. The PGOQ was used in preference to more traditional measures of goal orientations (such as the TEOSQ and the POSQ) as it allows us to explore the relationship between social approval goal orientations and the use of process goals, as well as the relationship between task and ego goal orientations and process goals. This would not have been possible using the TEOSQ or POSQ.

Process Goals. The participants' use of process goals were measured using a modified version of a questionnaire developed by Harwood (1997) for use with junior tennis players. Reliability analyses from Harwood (1997) showed all eight-process goal scales reached acceptable levels (α = .71 to .89). The questionnaire was adapted for rugby union by the first author and then assessed by three high-level rugby union players

and one coach to ensure the questionnaire had acceptable face validity. Feedback was generally positive regarding this, but items were modified/removed where feedback suggested items did not posses good face validity. The questionnaire assessed participants' use of process goals in two ways: 1) by having them indicate how important it was for them to perform satisfactorily with regard to different processes underpinning performance; and 2) by having them indicate the extent to which they assessed the quality of their performance with regard to those processes after a game. The authors believed that assessing importance of a process focus and the post-game evaluation of their process focus would reflect the use of process goals without interrupting the athlete's competitive environment.

More precisely, the questionnaire asked participants to rate on a 10-point Likert scale (anchored at two points; 1 = Not at all important; 10 = Extremely important) 'How important it was for you to feel successful and satisfied with…' four *technical* aspects of rugby (passing, tackling, running with ball in hand, running off the ball), three *physical* aspects (speed/power/agility, strength, stamina/endurance), four *tactical* aspects of rugby (attacking, defending, positional play, game plan), and three *mental* aspects (concentration, communication, positive thoughts about performance). Ratings were then averaged to give subscale scores for 'Technical Importance', 'Physical Importance', 'Tactical Importance', and 'Mental Importance'. Participants were then asked to rate on a 10-point Likert scale (anchored at two points; 1 = Not at all; 10 = Very much so) 'to what extent do you personally assess the quality of your [skill] after the match… ' for the four technical, four tactical, three physical, and three mental components. Scores were averaged to give subscale scores for 'Assess Mental Skills After the Game,' 'Assess

Physical Skills After the Game,' 'Assess Technical Skills After the Game,' and 'Assess Tactical Skills After the Game.' This indirect format for assessing athletes' use of process goals was used because, in the researchers' experience, many athletes do not really understand what process goals are without engaging in quite lengthy training on the subject.

Results

Descriptive Statistics

Means, standard deviations, and ranges for age, gender, years playing experience, and performance level and the 11 measured variables are displayed in Table 1. Cronbach's alphas for three of the four PGOQ scales reached acceptable levels (.70; Nunnally, 1978); Self-directed Task (.83), Self-directed Ego (.77), and Social Approval Ego (.90). Social Approval Task (.59) did not reach an acceptable level, so results relating to this variable should be regarded with caution. The Social Approval Task data was retained in the primary analyses because Miller (1995) presents compelling evidence that alpha represents very much a lower bound on test reliability and "has little or no value as an index of test homogeneity or unidimensionality" (p. 270) in the presence of a satisfactory CFA. This data set was a subset of the data used in Harwood *et al.*'s (2002: chapter 2) CFA study which showed good fit statistics for the four factor model ($x^2 = 59.8$ ($p<.05$); RMSEA = 0.05; NNFI = 0.96; CFI = 0.97; SRMR = 0.03).

Table 1
Descriptive Statistics for Age, Years Playing Experience, Gender and Level and the 12 Measured Variables

	N	Mean	SD	Range
Age	150	24.31	6.02	14-45
Experience (years)	150	9.17	7.92	1 –37
Gender				
Male	78			
Female	72			
Level				
Club – Amateur	48			
Club – Professional	8			
County	60			
National Age Group	16			
National	18			
Importance of the Skill				
Mental	150	7.92	1.57	3.33-10
Technical	150	8.13	0.99	6.00-10
Tactical	150	8.25	1.12	5.25-10
Physical	150	7.93	1.31	5.00-10
Assess Skill After the Game				
Mental	150	6.08	2.02	2.00-10
Technical	150	6.79	1.52	3.50-10
Tactical	150	7.39	1.34	3.50-10
Physical	150	6.87	1.70	2.67-10
Self-directed Task	140	5.70	0.90	2.75-7
Self-directed Ego	136	5.59	0.99	2.75-7
Social-approval Task	136	5.42	0.90	1.75-7
Social Approval Ego	136	4.65	1.29	1.50-7

Cronbach's alphas for seven of the eight process goal variables reached acceptable levels: Mental Importance (.70), Physical Importance (.78), and Tactical Importance (.76), Assess Mental Skills After the Game (.75), Assess Physical Skills After the Game (.78), Assess Technical Skills After the Game (.72) and Assess Tactical Skills After the Game (.70). Technical Importance (.61) did not reach an acceptable level. Consequently, this subscale was removed from further analysis because it had not been previously subjected to confirmatory factor analysis.

Primary Analysis

Table 2 shows the Pearson's correlation matrix for the four achievement goal variables and the seven process goal variables. The correlation matrix indicates high correlations between the achievement goal variables, which could reflect multicollinearity. Belsley, Kuh and Welsch (1980) recommend the combined use of two methods to detect collinearity; variance decomposition proportions and the condition index. Variance decomposition provides an indicator of how much each independent variable contributes (as a proportion) to the total variance for that particular regression coefficient. Serious collinearity problems are indicated when an independent variable contributes more than 50% of the variance of two or more dimensions in a single regression equation. The condition index provides a number to show the extent of near singularity of independent variables. Condition indices around 10 indicate weak dependencies. Condition indices of 30 to 100 indicate moderate to strong dependencies, and indices larger than 100 indicate serious collinearity problems. Belsley *et al.* (1980) recommend than any independent variable that has a condition index above 30 and contributes more than 50% of the variance to two or more regression coefficients should be excluded from the

Table 2
Pearson Correlations for the Four Achievement Goals and the Seven Process Goals

	1	2	3	4	5	6	7	8	9	10	11
1. Mental Importance	1.00	.64**	.58**	.57**	.39**	.50**	.46**	.57**	.32	.39**	.20*
2. Tactical Importance	.64**	1.00	.67**	.41**	.34**	.60**	.44**	.42**	.24**	.28**	.03
3. Physical Importance	.58**	.67**	1.00	.31**	.37**	.42**	.64**	.46**	.33**	.26**	.21*
4. Assess Mental Skills	.57**	.41**	.31**	1.00	.56**	.61**	.61**	.32**	.16	.30**	.08
5. Assess Technical Skills	.39**	.34**	.37**	.56**	1.00	.67**	.66**	.40**	.17	.13	-.08
6. Assess Tactical Skills	.50**	.58**	.42**	.61**	.67**	1.00	.69**	.31**	.16	.21*	.07
7. Assess Physical Skills	.46**	.44**	.64**	.61**	.66**	.69**	1.00	.48**	.27**	.19*	.14
8. Self-directed Task	.57**	.42**	.46**	.32**	.40**	.31**	.48**	1.00	.69**	.63**	.51**
9. Self-directed Ego	.32**	.24**	.33**	.16	.17	.16	.27**	.69**	1.00	.65**	.69**
10. Social-Approval task	.39**	.29**	.26**	.30**	.13	.21*	.19*	.63**	.65**	1.00	.72**
11. Social Approval Ego	.20*	.03	.21*	.08	-.08	.07	.14	.51**	.69**	.72**	1.00

* = significant correlation at $p<.05$

** = significant correlation at $p<.01$

regression model. When the diagnostics were carried out on the present data, all achievement goal variables were below the recommended diagnostic threshold and were included in the regression analysis (see Table 3 for the colliniarity diagnostics).

Stepwise regression analysis was conducted to identify which goal orientations predicted: (a) the importance of process goals; and (b) the extent to which individuals assessed process goal achievement after a match. Due to the risk of committing Type 1 error when running multiple regression analysis, the alpha level was set at 0.005. The dependent variables were the seven measures of process goals and the independent variables were the four measures of achievement goals. For five of the seven process goal questions (Mental Importance, Physical Importance, Assess Tactical Skills After the Game, Assess Physical Skills After the Game, Assess Mental Skills After the Game), Self-directed Task was the only significant predictor ($p < 0.005$) and the β-coefficients were all positive. For Tactical Importance, Self-directed Task, Social Approval Ego, and Social Approval Task were all significant predictors of the dependent variable. Self-directed and Social Approval Task had positive β-coefficients; Social Approval Ego had a negative β-coefficient. For Assess Technical Skills After the Game, Self-directed Task and Social Approval Ego were the only significant predictors; Self-directed Task had a positive β-coefficient and Social Approval Ego had a negative β-coefficient. Regression results are displayed in Table 4.

Table 3
Collinearity Diagnostics for the Regression Analysis (Tactical Importance and Assess Technical Skills After the Game)

Model	Dimension	Condition Index	Variance Proportions (Constant)	self-directed task	social approval ego	social approval task
1	1	1.00	.01	.01		
	2	12.90	.99	.99		
2	1	1.00	.00	.00	.01	
	2	8.64	.17	.03	.88	
	3	16.39	.83	.96	.11	
3	1	1.00	.00	.00	.00	.00
	2	9.81	.15	.03	.53	.00
	3	18.81	.80	.61	.14	.03
	4	22.79	.05	.36	.33	.97

Table 4
Regression Results and β-coefficients for Achievement Goal Orientations on Process Goal Variables

Predictor	R^2	*d.f*	*F*	*p*	β
Mental Importance					
Self-directed Task	.36	1, 128	71.6	.000	.60
Tactical Importance					
Self-directed Task	.17	1, 128	26.5	.000	.41
Self-directed Task + Social Approval Ego	.22	2, 127	17.5	.000	-.24
Self-directed Task + Social Approval Ego + Social Approval Task	.26	3, 126	14.7	.000	.34
Physical Importance					
Self-directed Task	.19	1, 128	30.7	.000	.44
Assess Mental Skills					
Self-directed Task	.09	1, 128	13.3	.000	.31
Assess Tactical Skills					
Self-directed Task	.09	1, 128	12.7	.001	.30
Assess Physical Skills					
Self-directed Task	.19	1, 128	30.6	.000	.44
Assess Technical Skills					
Self-directed Task	.16	1, 128	24.6	.000	.40
Self-directed Task + Social Approval Ego	.26	2, 127	22.3	.000	-.36

Discussion

As previously indicated, results involving Social Approval Task should be interpreted with caution. Nevertheless, correlation analyses showed that the relationships between Self-Directed Task and seven process goal variables were all positive and significant. Five of the seven process variables were also positively and significantly related to Self-directed Ego. Furthermore, six of the seven process variables showed a positive and significant relationship with Social Approval Task; therefore the need to show others improvements is also associated with the use of process goals. Two of the seven process variables were positively and significantly related to Social Approval Ego (against predictions). Importantly, there were no significant negative relationships.

In line with predictions, what these correlation results tell us is that rugby players with high levels of Self-directed Task, Self-directed Ego, and Social Approval Task goal orientations have a process focus. Players with high levels of Self-directed Task focus on personal improvement; therefore, setting process goals would enable these athletes to satisfy their conception of success. Players with high levels of Self-directed Ego want to outperform their competitors and setting process goals may enable these players to satisfy their conception of success. Rugby players with high levels of Social Approval Task goal orientation also have a process focus as they may wish to demonstrate to 'significant others' that they are improving. By setting process goals, the players are able to focus on improving their performance standards so 'significant others' recognize their improvements.

Regression analysis results showed that Self-directed Task was a powerful predictor of a process focus, which supports Duda *et al.*'s (1991) and Zimmerman and Kitsantas' (1996) assertion that task involvement is associated with a process focus.

This result indicates that those who have an influence over the achievement context should promote high levels of Self-directed Task goal orientation in players by working with them to set process goals to promote the desire for constant improvement of personal performance. Correlation results showed that Self-directed Ego had significant positive relationships with five process goal variables. However, when the other goal orientations were controlled for, regression analyses indicated that Self-directed Ego did not predict (positive or negative) any process goal variables. Therefore, those who influence the achievement context should not discourage high levels of Self-directed Ego goal orientation, as these athletes may set process goals if it serves to satisfy their achievement orientation (Hardy, 1997, 1998).

These results add support to Hardy's (1997, 1998) argument that high levels of ego orientation do not predispose individuals *against* a process focus, as there were no significant negative correlations. For example, a highly Self-directed Ego oriented individual may focus on the technical processes of performance (e.g., tackling, passing, running with the ball, running without the ball) if they knew that this focus will enable them to perform to a higher level than those who are competing against them. Consequently, as Hardy (1997, 1998) has argued, high Self-directed Ego oriented individuals may well set process goals if it serves to satisfy their achievement orientation. Furthermore, athletes with high levels of Self-directed Ego may also have high levels of Self-directed Task goal orientations (as indicated by the strong correlation between Self-directed Ego and Task), which may override any negative consequences of having high levels of Self-directed Ego Goal Orientation to maintain a strong process focus.

A result of the regression analysis also showed Social Approval Ego was a significant negative predictor of two process goal variables (Tactical Importance and

Assess Technical Skills After the Match) when Self-directed Task and/or Social Approval Task were already in the equation. This result suggests that individuals with high levels of Social Approval Ego goal orientation did not focus on the specific processes of performing. Athletes who are constantly seeking approval from others regarding one's attempts to gain superiority over the opposition may have an inappropriate focus (i.e., away from the processes of performance). In contrast, individuals with high levels of Self-Directed Ego or Task orientation may still be able to recognise the importance of focusing on the specific processes of performance, as this will hopefully lead to them gaining a sense of achievement by experiencing normative superiority or improved personal performance.

One interesting finding was that Social Approval Task was significantly correlated to six out of seven process goal variables and significantly and positively predicted two process goal variables. Even allowing for its low Cronbach's alpha, this result suggests that having high levels of task goal orientation is related to a focus on the processes of performing, regardless of whether the task orientation is directed internally (Self-Directed) or externally (Social Approval). This finding reinforces (a) the role of significant others (i.e., coaches, selectors, team mates) within the competitive sporting environment (Pensgaard & Roberts, 2000); and (b) the importance of including social approval when investigating achievement goals in sport (Allen, 2003, 2005; Harwood, Wilson and Hardy, 2002: chapter 2; Stuntz & Weiss, 2003). The result also highlights a potential advantage of Harwood *et al.*'s (2002: chapter 2) and Wilson *et al.*'s (in preparation: chapter 2) new measurement tool over existing tools, such as the TEOSQ (Duda & Nicholls, 1992) and POSQ (Roberts *et al.,* 1998), in that it allows the investigation of aspects of achievement goal involvement those other tools do not.

The current correlation results show that individuals with high levels of both Self-Directed Task and Self-Directed Ego orientation set process goals. This finding is in direct contrast to the suggestion that high ego orientations lead to a lack of process focus (Papaioannou & Kouli, 1999; Weinberg *et al.,* 1988). These results may be due to the nature of the participants in the current sample. The majority (68%) of participants were high-level performers, which may mean that they had higher levels of perceived competence (Allen & Howe, 1998; Hardy, Jones & Gould, 1996) than participants in other studies. To high level athletes within this sample, high levels of ego involvement may not be detrimental to performance or lead to maladaptive behaviours (cf. Kingston & Hardy, 2001), as high levels of perceived competence may protect against the potential negative affects of a high ego orientation. Having said that, it is important to note that Self-Directed Task was the strongest and most significant predictor of a process focus, a finding that is consistent with Duda *et al.*'s (1991) and Zimmerman and Kitsantas' (1996) contentions.

An issue that does need to be resolved are the high correlations between the four achievement goal variables (r = 0.51 to 0.72). Nicholls (1984) originally conceptualised two orthogonal achievement goals. The high correlations indicate that the four factors are not independent of each other. This is not surprising considering that four of the possible six factor pairs share either a self-directed or social approval component. However, regression results suggest that the achievement goals are orthogonal enough to explain significant proportions of independent variance (sig R^2_{change}) in the process goal variables. The high correlations between the factors are an issue that needs to be addressed to ensure our understanding of the relationship between these achievement goals (i.e., orthogonal or bipolar) is transparent.

The results of the present study confirm that performers who are high in Self-Directed Task and, to a lesser extent Self-Directed Ego orientation, do focus on the processes of performing. This suggests that careful consideration is required before discouraging Self-directed Ego orientations in high-level athletes, as it remains unproven that high levels of ego orientation *per se* are detrimental to performance (i.e., unable to maintain a process focus). The results showed that high Self-Directed Ego-oriented individuals maintained or enhanced a process focus, possibly because they perceive that this focus will enable them to satisfy their achievement orientation. However, Self-directed Task goal orientation had the strongest (predictive) relationship with process goal variables. This suggests that athletes with high levels of Self-directed Task Goal Orientation are more likely to set process goals than those high in Self-directed Ego, Social Approval Task and Social Approval Ego.

Those who influence the achievement context should promote high levels of Self-directed Task Orientation when the use of process goals may facilitate performance. For example, prior to competition a process goal focus may be deemed facilitative, as opposed to a focus upon outcome goals, for successful performance (Kingston & Hardy, 1997). Therefore, coaches/managers should encourage their athletes to become more Self-directed Task involved (e.g., focus on the need to make progress in the execution of their skills) prior to competition in a hope that they will employ a process focus.

Social Approval Task (six) and Social Approval Ego (two) orientations had significant and positive correlations with process goal variables. However, these positive relationships are lost when the other goal orientations are controlled for in the regression analyses (except for Social Approval Task predicting Tactical Importance). Despite this, the correlation results confirm research that has shown that social

approval and/or significant others are an influential ingredient in the competitive environment (Allen, 2003, 2005; Ewing, 1981; Hayashi, 1996; Jarvinen & Nicholls, 1996; Lewthwaite, 1990; Lewthwaite & Piparo, 1993; Schilling & Hayashi, 2001; Stuntz & Weiss, 2003; Whitehead, 1995). The regression results also suggest that athletes who have high levels of Social Approval Task orientation are still able to maintain a process focus. Coaches and managers who structure the training and competitive environment should not ignore the potential influence they may have on players. What coaches/managers might attempt to do is assess each individual's achievement orientations (they may have more than one and their orientations could change in different contexts) and encourage players to focus on the processes of playing in such a way that each individual's achievement orientation is satisfied. For example, if an individual has high levels of Social Approval Task orientation; coaches could encourage that player to focus on showing them and their team mates that they can improve their skills (e.g., tackling, passing). They could emphasize to players that they will be watching their performance closely to see if they have made progress in their skills. To an individual with high levels of Self-directed Task orientation (and low levels of Social Approval Task), this comment might be detrimental to performance, as they would feel pressure from others, which is not an important component of their achievement orientation.

A major limitation of the present research is that the structural validity of the measure of achievement goals has yet to be confirmed. Harwood *et al.* (2002: chapter 2) utilized confirmatory factor analysis in an exploratory fashion to develop the 16-item questionnaire (PGOQ). While the fit statistics were generally good, the factor structure and construct validity of this 16-item questionnaire still needs to be confirmed. The rationale for using this questionnaire in preference to other available

measures was to ensure that: (a) the intended constructs were measured directly, and not indirectly via hypothesised behavioural correlates of those constructs; (b) the measurement tool used had good contextual specificity to competitive sport, and (c) the role that social approval goals might play in influencing the use of process goals could be explored. The current findings clearly offer some evidence for the predictive validity of the questionnaire.

A second possible limitation of the present study was that the use of process goals was measured in a rather indirect fashion. Asking participants to rate the importance of specific processes and whether they assessed these processes after performance does not directly assess whether the athletes in the sample set process goals prior to a match, which they then employed during a match. The rationale for this has already been given in the Method section.

A final limitation of the study is that perceptions of competence were not measured. As stated previously, a high ego orientation is generally only detrimental to performance when combined with low levels of perceived competence (Nicholls & Miller, 1983. 1984). Consequently, one could argue that in order to examine the relationship between ego goal orientations (self-directed and social approval) and the use of process goals, perceptions of competence should have been taken into account. However, the authors would contend that the inclusion of perceived competence would have considerably complicated the analyses that would have to be performed and can, in any case, be the subject of future research. In addition, due to the diverse nature of the sample (experience and level), levels of perceived competence may also vary, which could confound results.

An obvious extension to the present research would be to investigate the relationship between (state) goal involvement and process goals. Research

investigating the relationship between dispositional and state goals within sport has found that there is a strong correlation between the two (Harwood & Swain, 1998; Swain & Harwood, 1996; Williams, 1998). However, findings have also shown that situational factors (e.g., opposition, previous record) and significant others (e.g., coach, parents, organisation) do influence the thought processes and goal involvement profiles of individuals prior to and during competition (Duda & Hom, 1993; Ebbeck & Becker, 1994; Swain & Harwood, 1996). While an individual may have a strong dispositional goal profile, recent innovative research by Gerignon, Arripe-Longueville, Deliginieres, and Ninot (2002) has shown that performers' state goal involvement profiles may change very rapidly during competition, and this may strongly influence their ability to maintain a process focus.

Conclusions and Summary

The results of the present study further our understanding of the relationship between achievement goals and the goal setting practices of athletes. The major finding of this research was that both Self-Directed Task and Self-Directed Ego orientations were positively and significantly associated with a process focus. Social Approval Task orientation was also positively related to a process focus. The regression analyses suggested that these variables may have a more complex relationship with a process focus when combined with Social Approval Ego orientation.

CHAPTER 4

INVESTIGATING THE INTERACTION BETWEEN MOTIVATIONAL CLIMATE AND ACHIEVEMENT GOAL ORIENTATIONS: MOTIVATION AND TENSION

Abstract

The present study investigated the interactive effects of achievement goals and motivational climate (matched and mismatched) upon motivation and tension. Two hundred and one athletes with ages ranging from 16 to 34 years (χ = 21.59; SD = 3.05) from a range of competitive levels participated in the study. The Perception of Success Questionnaire (POSQ; Roberts *et al.*, 1998), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton *et al.,* 2000), the Sport Motivation Scale (SMS; Pelletier *et al.*, 1995), and the modified Profile of Mood States (POMS-A; Terry *et al.,* 1999) were used to measure achievement goals, motivational climate, motivation, and tension respectively. Significant interactions emerged for Ego Orientation and Performance Climate on Intrinsic Motivation (IM) to Gain Knowledge, IM to Experience Stimulation, IM to Accomplish, and Introjected Regulation. Significant interactions also emerged for Ego Orientation and Mastery Climate on IM to Gain Knowledge, IM to Accomplish, and Introjected Regulation. The interactions suggested that: (1) performance climate exerted a positive effect on the intrinsic motivation of high ego oriented athletes, but a negative effect on the intrinsic motivation of low ego oriented athletes; (2) mastery climate exerted a more positive effect on the intrinsic motivation of low ego oriented athletes compared to high ego oriented athletes; (3) the intrinsic motivation of high ego oriented athletes was generally higher than the intrinsic motivation of low ego oriented athletes.

Nicholls' (1984, 1989) Achievement Goal Theory has enhanced our understanding of achievement behaviour in sport since it's adaptation to this context from education (Duda, 1992, 1993). Nicholls' (1984, 1989) theory assumes that the individual and the situation interact to determine the type of goal involvement profile that the individual adopts in various achievement contexts (Ames, 1992a, b, c; Dweck & Legget, 1988). Previous research investigating the relationship between achievement goals and situational contexts (motivational climate) in which athletes perform (Kavussanu & Roberts, 1996; Ommundsen, Roberts & Kavussanu, 1998; Seifriz, Duda, & Chi, 1992; Treasure & Roberts, 1998) has predominantly focused on the additive effects of dispositional goal orientations and motivational climate, not their interaction. The present study investigates the interaction between dispositional goal orientations and motivational climate in sporting contexts.

According to achievement goal theory, individuals engage in achievement contexts to demonstrate competence. Nicholls (1984) proposed that competence could be conceptualised in two ways; with reference to one's own past performance, or with reference to one's performance relative to others. When gains in personal performance/mastery indicate competence, individuals are said to be task orientated. When competence is judged by the demonstration of superior performance in comparison to others, or by similar performance being achieved with less effort, individuals are said to be ego orientated.

Ames (1992a, b, c) proposed that the motivational environment or 'climate' influences the meaning of achievement by informing the athlete about what he or she has to do in order to maximise achievement in specific situations. Ames and Archer (1988) found that individuals made distinctions between two climates based on evaluative practises, social comparisons, reward and punishment structures, and the

quality of interpersonal relationships. They labelled these two climates mastery (task-involving) and performance (ego-involving). However, it is worth noting that this educational research was focused solely on teachers' influence over the motivational climate within the classroom.

In the current study, predictions about interactions between dispositional goal orientations and motivational climate are underpinned by the person-environment (P x E) fit hypothesis (Pervin, 1968). This hypothesis suggests that for each individual there are environments that more or less match his or her personality characteristics. A 'match' between personality and situation is predicted to result in high performance, satisfaction, and low levels of anxiety (Hunt, 1973; Hunt & Sullivan, 1974; Stuempfig, 1975). A 'mismatch' is expected to result in performance decrements, dissatisfaction, and high levels of anxiety. In line with the P x E fit hypothesis, Roberts (1992) hypothesised that when ego-oriented individuals perform in a mastery climate (i.e., mismatch), conflict would result, causing less motivation to achieve. Roberts made comparative predictions regarding a task orientation and performance climate. Rather surprisingly, only one study has to date directly examined the P x E fit hypothesis (Newton & Duda, 1999).

A number of studies have examined the combined effects of dispositional goals and motivational climate (Kavussanu & Roberts, 1996; Ommundsen, Roberts & Kavussanu, 1998; Seifriz, Duda, & Chi, 1992; Treasure & Roberts, 1998). However, while these studies claim to test the interactive effects of motivational climate and dispositional achievement goals, the statistical analysis utilised only examined the additive effects. Only a small number of studies have actually investigated interactions between achievement goals (dispositional and state) and motivational

climate in sport (Cresswell, Hodge & Kidman, 2003; Harwood & Swain, 1998; Newton & Duda, 1999; Swain & Harwood, 1996).

Cresswell *et al.* (2003) investigated the interactive effects of motivational climate and dispositional goals on motivation related variables in junior football players. Results showed that an interaction between mastery climate and task orientation significantly predicted perceived competence. More precisely, Cresswell *et al.* (2003) showed that athletes with high levels of task orientation maintained high levels of perceived competence as the climate got more mastery focused. For athletes with low levels of task orientation, perceptions of competence increased as the climate got more mastery focused. Cresswell *et al* concluded that a strong mastery climate was more important for athletes with low levels of task orientation in order for them to have high perceptions of competence. However, there were no significant interactions between achievement goals and motivational climate on any other intrinsic motivation variables [including pressure/tension as measured by the Intrinsic Motivation Inventory (IMI); McAuley, Duncan, & Tammen, 1989]. Markland and Hardy (1997) have raised concerns over the validity and reliability of the IMI. Markland and Hardy stated that the results of confirmatory factor analysis conducted by McAuley *et al.* (1989, 1991), were "by conventional standards... far from optimal" (p. 21). They also suggest that the hierarchical model utilised by McAuley *et al.* which underpins the IMI, does not accurately reflect the formal propositions of Cognitive Evaluation Theory (Deci & Ryan, 1985). These issues raise doubts over the reliability of results obtained utilising the IMI.

Swain and Harwood (1996) examined the ability of dispositional and situational variables to predict state goals in age group swimmers. A state task goal was predicted by an interaction between dispositional task goals and the perceived

state goal preference of a significant other. The interaction suggested that when significant others were perceived as being task involved and the dispositional orientation matched (i.e., task orientation), the athlete would have higher levels of state task involvement. However, Harwood and Swain (1998) found no significant interactions between dispositional achievement goals and motivational climate on state goals in elite junior tennis players.

Newton and Duda (1999) utilised junior female volleyball players to test the P x E fit hypothesis but found no significant interactions between dispositional goals and motivational climate on intrinsic motivation (or pressure/tension variable as measured by the IMI; McAuley, Duncan, & Tammen, 1989). A significant interaction did emerge for task orientation and mastery climate on the belief that effort leads to success. Volleyball players who had high levels of task orientation showed a strong belief that effort leads to success regardless of the level of mastery climate present. However, for players who had low levels of task orientation, the extent to which they believed effort leads to success was dependent upon the strength of mastery climate (as the climate got more mastery focused, the belief that effort leads to success increased). As outlined earlier, the lack of significant interactions on intrinsic motivation may be due to the limitations of the measure.

The present study aimed to re-examine the interaction hypothesis in an attempt to clarify the findings of Newton and Duda (1999) and Cresswell *et al.* (2003) (i.e., lack of significant interactions of achievement goals and motivational climate on intrinsic motivation and tension). The study will sample a wider range of athletes with respect to age, gender, and sport choice. The study also aimed to investigate the interaction effects (matched and mismatched) of motivational climate and achievement goals upon Tension, in order to provide a more direct test of Robert's

(1992) conflict hypothesis. Unlike the previous research outlined above (Cresswell *et al.,* 2003; Newton & Duda, 1999), this study will examine intrinsic motivation, extrinsic motivation, and amotivation, in order to obtain a more complete picture of the motivational state of athletes.

Self-Determination Theory (Deci & Ryan, 1985) predicts that athletes seek certain goals through their sport involvement, and these goals are fuelled by three needs: competence (to interact efficiently with the environment), autonomy (desire to be self-initiating), and relatedness (to feel connected to significant others). The theory predicts that opportunities that satisfy athlete's needs, and subsequent goals, will facilitate motivation. Deci and Ryan (1985) proposed a self-determination continuum, along which Intrinsic Motivation to Accomplish, to Gain Knowledge, and to Experience Stimulation were classed as variables high in self-determination (Vallerand, 1992). Identified Regulation, Introjected Regulation, External Regulation, and Amotivation were placed on the continuum towards non-self-determination, with Identified Regulation placed closest to the Intrinsic Motivation variables and Amotivation placed at the other end. Deci and Ryan (1985) and Vallerand and Losier (1999) hypothesised that when social factors (i.e., motivational climate) support an athlete's needs (competence, autonomy, relatedness), self-determined motivation (Intrinsic Motivation, Identified Regulation) will be high. Alternatively, when social factors do not support an athlete's needs, non-self-determined motivation (Introjected Regulation, External Regulation, Amotivation) will be high.

It was predicted that: athletes who had high levels of task orientation would show high levels of self-determined motivation and low levels of tension in a strong mastery climate (matched), as this climate reinforced their dispositional goal orientation and social factors support the athlete's needs (Deci & Ryan, 1991);

conversely, athletes with low levels of task orientation would show stable levels of self-determined motivation and tension as mastery climate increased in strength because these athletes are neither motivated nor conflicted by their environment. The predicted task orientation and mastery climate relationship is represented in Figure 1 below.

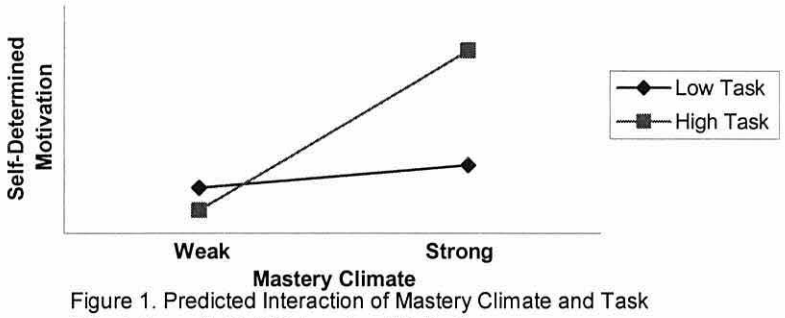

Figure 1. Predicted Interaction of Mastery Climate and Task Orientation with Self-Determined Motivation

We also predict that in a strong performance climate; athletes who have high levels of task orientation (mismatched), will show low levels of self-determined motivation and high levels of tension, because of the P x E conflict and because social factors do not support the athletes needs (Deci & Ryan, 1991); whereas the self-determination and tension of athletes who have low levels of task orientation will not be influenced by the performance climate. The predicted relationship between task orientation and performance climate is represented in Figure 2 below. Finally, we predict comparable interactions for the combined effects of ego orientation with performance climate, and ego orientation with mastery climate.

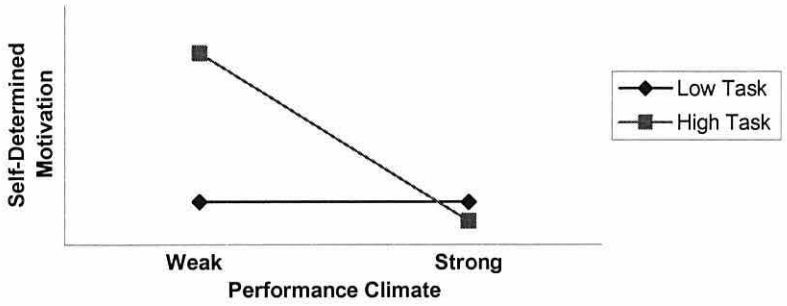

Figure 2. Predicted Interaction of Performance Climate and Task Orientation with Self-Determined Motivation

Method

Participants

Two hundred and one athletes participated in the study. There were 133 males and 68 females with ages ranging from 16 to 34 years (x = 21.59; SD = 3.05). Participants had been with the same coach for a mean of 2.85 years and the same team for a mean of 3.51 years. Athletes competed in a variety of sports (e.g., rugby, football, netball, basketball, lacrosse, athletics, hockey, martial arts) at school (n = 10), club (n = 64), regional (n = 78), national (n = 27), and international (n = 22) levels.

Procedure

The author approached coaches and clubs to outline the study and gain permission to approach players to participate in the study. Once permission was granted, the researcher (or trained assistants) approached athletes/teams prior to a training session and explained the nature of the study. Participants were then asked to sign an informed consent form (parental consent was also sought for athletes under 18 years of age), were made aware that they could withdraw from the study at any time without penalty, and were told and that all the information given would remain confidential. Inclusion criteria for the study were that participants must: (a) have been with the same coach/team for longer than 3 months; and (b) be over 16 year of age. The

rationale for inclusion criterion (a) was so that the motivational climate had had enough time to exert any potential influence over the participant. The rationale for inclusion criteria (b) was to ensure each participant's dispositional achievement goal orientations were developmentally well established (Nicholls, 1989). Participants then completed a small battery of questionnaires that took approximately 30 minutes to complete. In return for participating in the study, athletes/teams were offered a workshop on motivation/goal setting and were sent a summary of the results of the study.

Measures

Goal Orientations. The Perception of Success Questionnaire (POSQ; Roberts, Treasure & Balague, 1998) was used to measure achievement goals. This is a 12-item questionnaire developed to measure task and ego achievement goal orientations. Six items relate to task and six items relate to ego goal orientations. The task goal orientation ($\alpha = .92$) and ego goal orientation ($\alpha = .90$) have shown excellent internal reliability (Roberts *et al.,* 1998). Participants were asked to respond to the stem "I feel successful in sport when..." on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). Exploratory factor analyses on the POSQ has been conducted with samples of high school children (Treasure & Roberts, 1994), adults (Roberts *et al.,* 1994) and elite athletes (Ommunsden & Roberts, 1996) all yielded two unique factors. Concurrent validity has also been found with task ($r = .69$) and ego ($r = .80$) subscales of the Task and Ego Goal Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992). While both the POSQ and TEOSQ have received criticism (Hardy, 1997, 1998; Harwood, Hardy & Swain, 2000), the POSQ is a widely used measure of achievement goal orientations and is more sport specific than the TEOSQ (Harwood, 2000).

Motivational Climate. The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda & Yin, 2000) was used to measure motivational climate. This is a 33-item questionnaire that measures a Mastery Climate (Important Role, Cooperative Learning, and Effort/Improvement) and Performance Climate (Intra-team Member Rivalry, Punishment for Mistakes, and Unequal Recognition). Seventeen items relate to a Mastery Climate and 16 items relate to a Performance Climate. Participants were asked to respond to the stem "circle the number which best represents how you feel..." on a 5-point Likert scale (1 = strongly disagree; 5 strongly agree). The Mastery Climate (α = .88) and Performance Climate (α = .87) scales have shown excellent internal consistency (Newton *et al.,* 2000). Newton and Duda (1997) utilised structural equation modelling to test the structure of the PMCSQ-2 and interpreted the findings as suggesting that the two factor model had an acceptable fit (GFI = .87, RMSR = .07)[1].

Motivation. The Sport Motivation Scale (SMS; Pelletier, Fortier, Vallerand, Tuson, Briere, & Blais, 1995) was used to measure motivation. This 28-item questionnaire measures Intrinsic Motivation (To Accomplish, To gain Knowledge, To Experience Stimulation), Extrinsic Motivation (Identified Regulation, Introjected Regulation, External Regulation), and Ammotivation. Four items represent each subscale. Participants were asked to respond to each item from the stem "why are you presently practicing your sport?" and responded on a 7-point Likert scale (1 = Does not correspond at all; 4 = Corresponds moderately; 7 = corresponds exactly). The scales have shown mixed internal consistencies in previous research (α = 0.63 to 0.80; Pelletier *et al.,* 1995). Pelletier *et al.* (1995) conducted a CFA to test the factorial validity of the SMS and concluded that the fit indices were acceptable [GFI = .94,

[1] These were the only fit statistics reported in Newton and Duda (1997) paper

RMSR = .05, NFI = .92]. Li and Harmer (1996) conducted CFA on male and female samples and reported acceptable fit indices [male (n = 442); x^2/d.f = 3.84, CFI = .98, RMSEA = .08; female (n = 415); x^2/d.f = 3.41, CFI = .99, RMSEA = .08][2].

Tension. The Profile of Mood States - A (POMS - A; Terry, Lane, Lane & Keohane,, 1999) was used to measure Tension. From this 24-item questionnaire, a shortened version of the POMS (McNair et al., 1981), we selected the items designed to measure Tension (Anxious, Nervous, Panicky, and Worried). Participants responded to the stem "how you feel about your sport in general" on a 5-point Likert scale (1 = not at all; 5 = extremely). The scales have shown good internal consistency, with the six factors (Tension, Depression, Anger, Vigour, Fatigue, and Confusion) ranging from 0.74 to 0.90, and the Tension subscale ranging from 0.74 to 0.82 (Terry et al., 1999). Terry et al (1999) suggested that the confirmatory factor analysis yielded acceptable fit indices for the 24-item version [CFI = .93, NNFI = .92, RMSEA = .06][3].

[2] These were the only fit statistics reported in the Li and Harmer (1996) paper
[3] These were the only fit statistics reported in the Terry et al (1999) paper

Results

Descriptive Statistics and

The means and standard deviations for all variables are displayed in Table 1.

Internal Reliability

The internal reliability of all scales reached acceptable levels (.70; Nunnally, 1978) and ranged from 0.73 to 0.92 (see Table 1). Pearson's correlations between the variables are displayed in Table 2.

Preliminary ANOVA's for Age, Gender, and Performance Level

Multiple analyses of variance were conducted for age, gender, and level on all 12 variables [goal orientations (task and ego), motivational climate (mastery and performance), motivation (seven), tension]. Bonferonni adjustments were made to the alpha level (0.05/12) to control for type I error, which was set at 0.004. For age, participants were put into one of three groups (<20; 21-22; 23+; created on the basis of having an approximately even number of participants within each age group) and ANOVA results showed there were no significant differences. For gender, again the ANOVA results were non-significant. For performance level, ANOVA results showed there were no significant differences between school, club, regional, national, and international level athletes. In light of these findings, all data was pooled for the rest of the analyses.

The Effect of Matched Dispositional Goals and Motivational Climate on Motivation and Tension

Moderated Hierarchical regression analysis was utilised to examine the interactive effects of matched Motivational Climate and Dispositional Achievement Goals on Motivation and Tension. Bonferonni adjustments were not made to the alpha level

Table 1

Descriptive Statistics and Alphas for Motivation, Tension, Goal Orientations and Motivational Climate Variables

	N	Mean	SD	α
Motivation Variables				
Intrinsic Motivation to gain Knowledge	201	4.76	1.07	.78
Intrinsic Motivation to Accomplish	201	5.37	1.08	.85
Intrinsic Motivation to Experience Stimulation	201	5.11	1.12	.78
Identified Regulation	200	4.35	1.19	.75
Introjected Regulation	201	4.12	1.28	.78
External Regulation	201	3.74	1.23	.74
Ammotivation	201	2.05	1.17	.82
Tension	201	2.15	0.78	.78
Motivational Climate				
Mastery Climate	201	3.91	0.64	.92
Performance Climate	200	2.62	0.73	.89
Goal Orientations				
Task	201	2.67	0.52	.84
Ego	201	1.33	0.78	.89

Table 2

Pearson Correlations Between the 12 Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Task Goal Orientation	1.00											
2. Ego Goal Orientation	-.07	1.00										
3. Mastery Climate	.38**	-.08	1.00									
4. Performance Climate	-.27**	.35**	-.54**	1.00								
5. IM Knowledge	.44**	.02	.38**	-.08	1.00							
6. IM Stimulation	.38**	.16*	.27**	-.04	.55**	1.00						
7. IM Accomplishment	.50**	.09	.34**	-.14*	.76**	.71**	1.00					
8. Identified Regulation	.28**	.05	.39**	-.12	.38**	.37**	.36**	1.00				
9. Introjected Regulation	-.13	.30**	-.13	.22**	.06	.12	.12	.18*	1.00			
10. External Regulation	-.05	.42**	-.04	.28**	.16*	.20**	.16*	.40**	.65**	1.00		
11. Ammotivation	-.30**	.03	-.35**	.38**	-.29**	-.45**	-.48**	-.13	.20**	.16*	1.00	
12. Tension	-.04	.13	-.13	.20**	.07	.13	.11	.05	.30**	.20**	.08	1.00

NB. * = $p < .05$; ** = $p < .01$

within the regression analysis, as the authors were interested in patterns of differences. As you cannot achieve random patterns of differences it was considered reasonable not to utilise bonferonni adjustment to control for type I error. Regression entry order was as follows: Dispositional Achievement Goals, Motivational Climate, and the cross product of Dispositional Achievement Goals and Motivational Climate. Prior to analysis, each independent and dependent variables was standardised to ensure common scaling (Tabachnick & Fidell, 1996) and unstandardised B-coefficients were used in the interpretation (Jaccard & Turrisi, 2003).

Task Goal Orientation and Mastery Climate

Regression results are displayed in Table 3. Task Goal Orientation showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Accomplishment, IM Stimulation, IM Knowledge, and Identified Regulation. In each case the B-coefficient was positive. Task Goal Orientation also had a significant main effect (significant R^2_{change}) on Amotivation, but this time the B-coefficient was negative. There were no significant main effects for Task Goal Orientation on Introjected Regulation, External Regulation, or Tension. Mastery Climate had significant main effects (significant R^2_{change}), over and above those associated with a task orientation, on the following dependent variables: IM Accomplishment, IM Stimulation, IM Knowledge, and Identified Regulation. In each case, the B-coefficient was positive. Mastery Climate also had a significant main effect (significant R^2_{change}) on Amotivation, but this time the B-coefficient was negative. There were no significant main effects for Mastery Climate on Introjected Regulation, External Regulation and Tension. There were no significant interactions between Task Achievement Goals and Mastery Climate on any dependent variables.

Table 3

Hierarchical Regression Analysis for Congruent Achievement Goal x Climate: Task Goal Orientation and Mastery Climate

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
IM Knowledge						
Task	.20	48.72	.000	1, 199	.44	.000
Mastery	.05	13.16	.000	1, 198	.24	.000
Task*Mastery	.00	0.32	.570	1, 197	.04	.57
IM Stimulation						
Task	.14	32.96	.000	1, 199	.38	.000
Mastery	.02	4.60	.03	1, 198	.15	.03
Task*Mastery	.01	2.65	.11	1, 197	-.11	.11
IM Accomplishment						
Task	.25	67.52	.000	1, 199	.50	.000
Mastery	.03	7.21	.008	1, 198	.18	.008
Task*Mastery	.00	.08	.77	1, 197	-.02	.77
Identified Regulation						
Task	.08	16.87	.000	1, 198	.28	.000
Mastery	.10	23.08	.000	1, 197	.34	.000
Task*Mastery	.01	2.32	.13	1, 196	-.10	.13
Introjected Regulation						
Task	.02	3.20	.08	1, 199	-.13	.08
Mastery	.01	1.74	.19	1, 198	-.10	.19
Task*Mastery	.00	.17	.68	1, 197	-.03	.68

Cont…

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
External Regulation						
Task	.00	.52	.47	1, 199	-.05	.47
Mastery	.00	.10	.76	1, 198	-.02	.76
Task*Mastery	.00	.06	.81	1, 197	-.02	.81
Amotivation						
Task	.09	19.03	.000	1, 199	-.30	.000
Mastery	.06	14.92	.000	1, 198	-.27	.000
Task*Mastery	.02	3.64	.06	1, 197	.12	.06
Tension						
Task	.00	.35	.55	1, 199	-.04	.55
Mastery	.01	2.89	.09	1, 198	-.13	.09
Task*Mastery	.00	.33	.57	1, 197	.04	.57

Ego Goal Orientation and Performance Climate

Regression results are displayed in Table 4. Ego Goal Orientation showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Stimulation, Introjected Regulation, External Regulation, and Tension. In each case, the B-coefficient was positive. There were no significant main effects for Ego Goal Orientation on IM Accomplishment, IM Knowledge, Identified Regulation and Amotivation. Performance Climate showed significant main effects (significant R^2_{change}), over and above any effects associated with ego orientation, on the following dependent variables: IM Accomplishment, Identified Regulation, External Regulation, Amotivation and Tension. For IM Accomplishment and Identified Regulation, B-coefficients were negative. For External Regulation, Amotivation and Tension, the B-coefficients were positive. There were no significant main effects for Performance Climate on IM Stimulation, IM Knowledge and Introjected Regulation. Ego Goal Orientation and Performance Climate showed significant interactions (significant R^2_{change}) on the following dependent variables: IM Knowledge, IM Stimulation, IM Accomplishment, and Introjected Regulation. The nature of these interactions is shown in Figures 3 to 6 from which it can be seen that the combination of a strong performance climate with low ego orientation was generally problematic, but the combination of a strong performance climate with a high ego orientation was not. Regression plots were derived by following the guidelines outlined by Jaccard and Turrisi (2003). There were no significant interaction between Ego Goal Orientation and Performance Climate on Identified Regulation, External Regulation, Amotivation, or Tension.

Table 4

Hierarchical Regression Analysis for Congruent Achievement Goal x Climate: Ego Goal Orientation and Performance Climate

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
IM Knowledge						
Ego	.00	.10	.75	1, 197	.02	.75
Performance	.01	1.45	.23	1, 196	-.09	.23
Ego*Performance	.03	5.40	.02	1, 195	.18	.02
IM Stimulation						
Ego	.02	4.40	.04	1, 197	.15	.04
Performance	.01	1.93	.17	1, 196	-.10	.17
Ego*Performance	.06	12.43	.001	1, 195	.27	.001
IM Accomplishment						
Ego	.01	1.27	.26	1, 197	.08	.26
Performance	.03	6.16	.01	1, 196	-.19	.01
Ego*Performance	.05	10.06	.002	1, 195	.24	.002
Identified Regulation						
Ego	.00	.38	.54	1, 196	.04	.54
Performance	.02	3.91	.05	1, 195	-.15	.05
Ego*Performance	.01	2.69	.10	1, 194	.12	.10
Introjected Regulation						
Ego	.10	20.62	.000	1, 197	.31	.000
Performance	.02	3.24	.07	1, 196	.13	.07
Ego*Performance	.03	7.75	.006	1, 195	.20	.006

Cont…

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
External Regulation						
Ego	.18	42.54	.000	1, 197	.42	.000
Performance	.02	4.92	.03	1, 196	.15	.03
Ego*Performance	.01	2.97	.09	1, 195	.11	.09
Ammotivation						
Ego	.01	.43	.51	1, 197	.05	.51
Performance	.15	33.72	.000	1, 196	.41	.000
Ego*Performance	.01	1.49	.22	1, 195	-.08	.22
Tension						
Ego	.02	4.23	.04	1, 197	.15	.04
Performance	.03	5.04	.03	1, 196	.17	.03
Ego*Performance	.01	.95	.33	1, 195	.07	.33

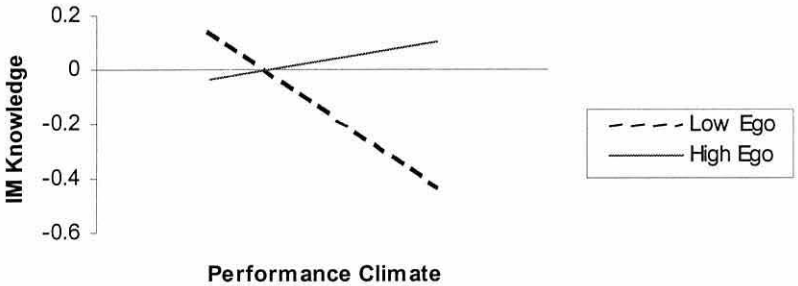

Figure 3. Interaction of Performance Climate and Ego Orientation with IM Knowledge

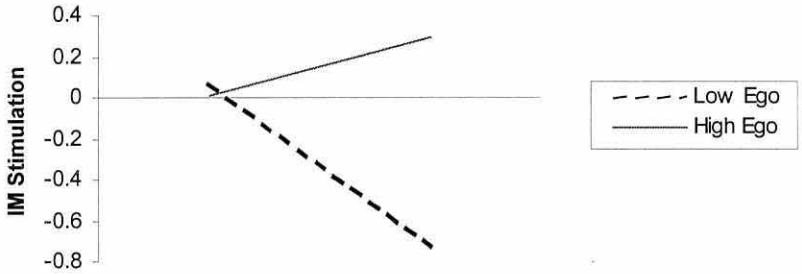

Figure 4. Interaction of Performance Climate and Ego Orientation with IM Stimulation

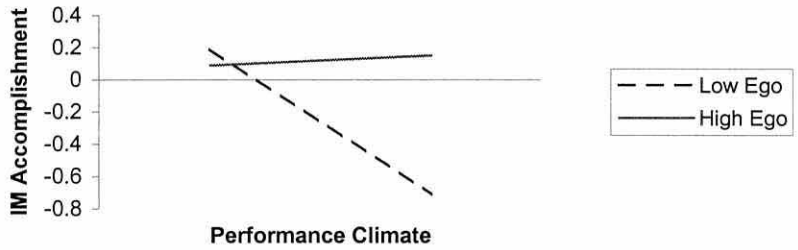

Figure 5. Interaction of Performance Climate and Ego Orientation with IM Accomplishment

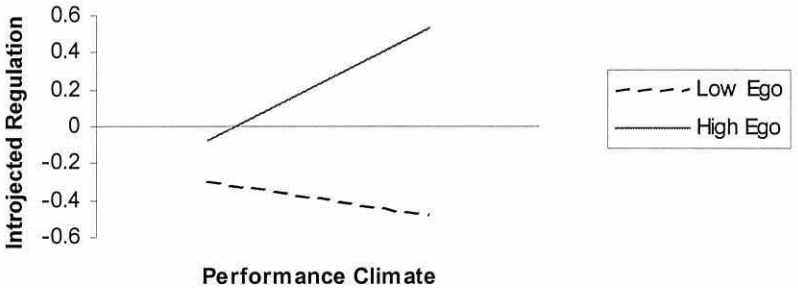

Figure 6. Interaction of Performance Climate and Ego Orientation with Introjected Regulation

The Effect of Mismatched Dispositional Goal and Motivational Climate on Motivation and Tension

Moderated Hierarchical regression analysis was utilised to examine the interactive effects of incongruent Motivational Climate and Dispositional Achievement Goals on Motivation and Tension. Regression entry order was as follows: Dispositional Achievement Goals, Motivational Climate, and the cross product of Dispositional Achievement Goals and Motivational Climate. Again, standardised values were used for the analysis and unstandardised B-coefficients were used for the interpretation.

Task Goal Orientation and Performance Climate

Regression results are displayed in Table 5. A Task Goal Orientation showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Knowledge, IM Stimulation, IM Accomplishment, and Identified Regulation. For all cases, B-coefficients were positive. Task Goal Orientation also had a significant main effect (significant R^2_{change}) with Amotivation. The B-coefficient was negative. There were no significant main effects for a Task Goal Orientation on Introjected Regulation, External Regulation or Tension. Performance Climate showed significant main effects (significant R^2_{change}), over and above any effects associated with task orientation, on the following dependent variables: Introjected Regulation, External Regulation, Amotivation, and Tension. For all cases, B-coefficients were positive. There were no significant main effects for a Performance Climate on IM Knowledge, IM Stimulation, IM Accomplishment, and Identified Regulation. There were no significant interactions between Task Orientation and Performance Climate on any dependent variables.

Table 5

Hierarchical Regression Analysis for Incongruent Achievement Goal x Climate: Task Goal Orientation and Performance Climate

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
IM Knowledge						
Task	.20	48.65	.000	1, 198	.45	.000
Performance	.00	.38	.54	1, 197	.04	.54
Task*Performance	.01	1.94	.17	1, 196	-.09	.17
IM Stimulation						
Task	.14	31.71	.000	1, 198	.37	.000
Performance	.00	.84	.36	1, 197	.06	.36
Task*Performance	.00	.06	.80	1, 196	-.02	.80
IM Accomplishment						
Task	.25	65.28	.000	1, 198	.50	.000
Performance	.00	.02	.88	1, 197	-.01	.88
Task*Performance	.00	1.02	.31	1, 196	-.06	.31
Identified Regulation						
Task	.08	16.19	.000	1, 197	.28	.000
Performance	.00	.41	.53	1, 196	-.05	.53
Task*Performance	.00	.77	.38	1, 195	.06	.38
Introjected Regulation						
Task	.01	2.91	.09	1, 198	-.12	.09
Performance	.04	7.76	.01	1, 197	.20	.01
Task*Performance	.00	.22	.64	1, 196	.03	.64

Cont...

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
External Regulation						
Task	.00	.55	.46	1, 198	-.05	.46
Performance	.08	16.34	.000	1, 197	.29	.000
Task*Performance	.00	.19	.66	1, 196	-.03	.66
Ammotivation						
Task	.08	17.51	.000	1, 198	-.28	.000
Performance	.10	24.59	.000	1, 197	.33	.000
Task*Performance	.00	.72	.40	1, 196	-.06	.40
Tension						
Task	.00	.18	.67	1, 198	-.03	.68
Performance	.04	7.68	.006	1, 197	.20	.006
Task*Performance	.01	.98	.33	1, 196	-.99	.33

Ego Goal Orientation and Mastery Climate

Regression results are displayed in Table 6. Ego Goal Orientation showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Stimulation, Introjected, and External Regulation. For all cases, B-coefficients were positive. There were no significant main effects for Ego Goal Orientation on IM Knowledge, IM Accomplishment, Identified Regulation, Amotivation, and Tension. Mastery Climate showed significant main effects (significant R^2_{change}), over and above any effects associated with ego orientation, on the following dependent variables: IM Knowledge, IM Stimulation, IM Accomplishment, Identified Regulation, and Amotivation. For all cases except Amotivation, B-coefficients were positive. There were no significant main effects for Mastery Climate on Introjected Regulation, External Regulation, and Tension. Ego Goal Orientation and Mastery Climate had significant interactions on the following dependent variables: IM Knowledge, IM Accomplishment, and Introjected Regulation. The nature of these relationships can be seen in Figures 7 to 9 from which it can be seen that a low mastery climate with low ego orientation was particularly problematic for intrinsic motivation.

Table 6

Hierarchical Regression Analysis for Incongruent Achievement Goal x Climate: Ego Goal Orientation and Mastery Climate

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
IM Knowledge						
Ego	.00	.12	.73	1, 198	.02	.73
Mastery	.14	33.18	.000	1, 197	.38	.000
Ego*Mastery	.02	5.40	.02	1, 196	-.16	.02
IM Stimulation						
Ego	.02	4.88	.03	1, 198	.16	.03
Mastery	.08	17.94	.000	1, 197	.29	.000
Ego*Mastery	.02	3.31	.07	1, 196	-.12	.07
IM Accomplishment						
Ego	.01	1.61	.21	1, 198	.09	.21
Mastery	.12	27.74	.000	1, 197	.35	.000
Ego*Mastery	.03	6.93	.009	1, 196	-.18	.009
Identified Regulation						
Ego	.00	.50	.48	1, 197	.05	.48
Mastery	.16	37.21	.000	1, 196	.40	.000
Ego*Mastery	.00	.35	.55	1, 195	-.04	.55
Introjected Regulation						
Ego	.10	19.50	.000	1, 198	.30	.000
Mastery	.01	2.72	.10	1, 197	-.11	.10
Ego*Mastery	.02	3.76	.05	1, 196	-.13	.05

Cont…

	R^2_{change}	F_{change}	SigF_{change}	*d.f*	Beta	SigBeta
External Regulation						
Ego	.18	42.55	.000	1, 198	.42	.000
Mastery	.00	.01	.91	1, 197	-.01	.91
Ego*Mastery	.01	1.36	.25	1, 196	-.08	.25
Ammotivation						
Ego	.00	.19	.67	1, 198	.03	.67
Mastery	.12	27.00	.000	1, 197	-.35	.000
Ego*Mastery	.00	.36	.55	1, 196	.04	.55
Tension						
Ego	.02	3.45	.07	1, 198	.13	.07
Mastery	.01	2.80	.10	1, 197	-.12	.10
Ego*Mastery	.01	1.97	.16	1, 196	-.10	.16

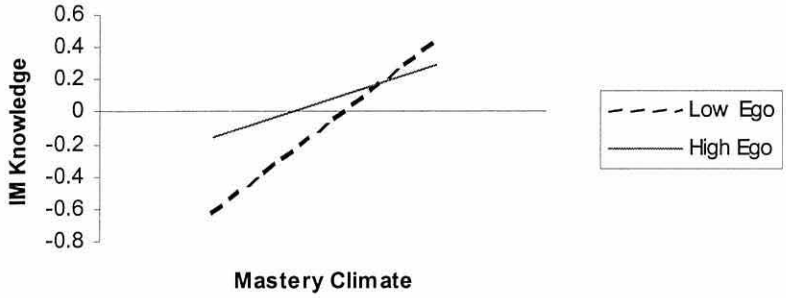

Figure 7. Interaction of Mastery Cimate and Ego Orientation w ith IM Know ledge

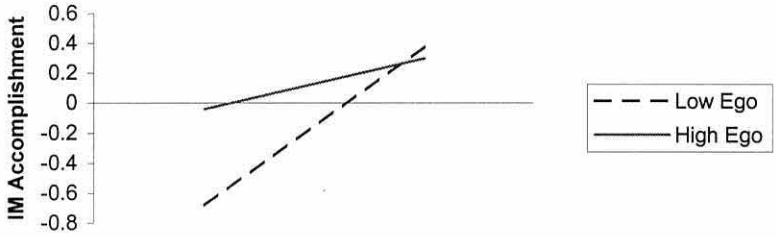

Figure 8. Interaction of Mastery Climate and Ego Orientation with IM Accomplishment

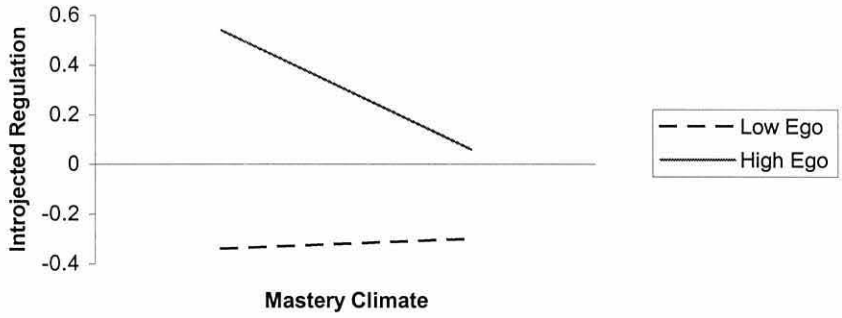

Figure 9. Interaction of Mastery Climate and Ego Orientation with Introjected Regulation

Discussion

The main aim of the present research was to investigate the interactive effects of matched and mismatched motivational climates and achievement goal orientations on motivation and tension in order to clarify the previously inconclusive findings of Newton and Duda (1999) and Cresswell *et al.* (2003).

The correlation matrix (see Table 2) indicated that conceptually related variables were correlated as expected. For example, ego orientation was moderately correlated to performance climate, introjected regulation, and external regulation. Task orientation was moderately to highly correlated with a mastery climate, the three intrinsic motivation variables, and identified regulation. Interestingly, tension was moderately correlated with a performance climate, introjected regulation, and external regulation. The correlations between motivation variables suggest that, in contrast to the current seven variables existing on a continuum of self-determination (Vallerand, 1992), there may in fact only be three motivation variables. In line with suggestion by Ryan and Deci (2000), these three variables include Intrinsic Motivation (IM to Gain Knowledge, IM to Accomplish, IM to Experience Stimulation, Identified Regulation), less Internalised Motivation (Introjected Regulation, External Regulation), and Amotivation.

According to the hypotheses, matched climate and goal orientations (e.g., strong mastery climate with high levels of task orientation) should result in increased self-determined motivation and decreased levels of tension. Contrary to expectations, but inline with the results found by Newton and Duda (1999) and Cresswell *et al.* (2003), no significant interactions were found for mastery climate and task orientation. While significant interactions were found for a performance climate and ego orientation, the nature of the interactions did not entirely match our hypotheses. In line with the hypotheses, when ego oriented athletes performed in a strong performance climate, levels of all three intrinsic motivation variables and introjected regulation were high. This result suggests that as the climate was reinforcing the athletes' dispositional orientations (i.e., social factors were supporting the athletes competence needs; Deci & Ryan, 1991), they had high self-determined motivation.

However, when athletes with low levels of ego orientation performed in a strong performance climate, this appeared to have a detrimental influence on their self-determined motivation. This pattern is consistent for all significant performance climate and ego orientation interactions (see Figures 3-6). From these results we may conclude that a strong performance climate may only be detrimental to self-determined motivation when athletes have low levels of ego orientation.

It is interesting that while the results for mastery climate and task orientation interactions are in line with those obtained by Newton and Duda (1999) and Cresswell *et al.* (2003), neither of the previous studies found significant interactions for performance climate and ego orientation. The reasons for this are not clear, but may be related to the samples utilised. The sample utilised by Newton and Duda were all junior athletes (x = 15.16 years; SD = 1.72) and all female. Past research has shown that younger athletes (Ewing, Roberts & Pemberton, 2003) and females (White & Zellner, 1996) tend to be more task orientated. In addition, the previous data was collected during a competitive tournament, either between or after games. The outcome of the athlete's games may have influenced their rating of motivational climate, achievement goals, and/or motivation. The sample utilised by Cresswell *et al.* (2003) was small (n = 107), were mainly male (n = 99), and were also junior athletes (x = 10.87 years; SD = 0.88). According to Nicholls (1989), children are unable to differentiate between ability and effort until the age of 11 to 12 years, which may influence their levels of ego involvement.

An additional difference between the current study and the studies by Newton and Duda (1999) and Cresswell *et al.* (2003) is the measurement tool utilised to assess motivation. Newton, Duda and Cresswell *et al.* utilised the IMI (McAuley *et al.*, 1989), which measures four specific components of intrinsic motivation

(enjoyment/interest; perceived effort/importance; perceived competence; pressure/tension). Markland and Hardy (1997) highlight several concerns regarding the factorial and construct validity of the IMI, as outlined in the introduction. Markland and Hardy (1997) concluded by stating, "a question mark remains over the psychometric integrity of the IMI as currently used" (p. 31). Newton and Duda (1999) report alpha coefficients for the IMI, with the effort/importance subscale failing to reach acceptable levels ($\alpha = .67$). In the present study, the Sport Motivation Scale (Pelletier *et al.,* 1995) was utilised, as the scale measures seven different forms of motivation (based on Self-Determination Theory; Deci & Ryan, 1985), allowing for a more refined investigation of the influence of interactions between the motivational climate and achievement goals may have on specific element of motivation.

With regards to mismatched motivational climate and achievement goals (e.g., high levels of task orientation and strong performance climate), it was predicted that self-determined motivation would be low and tension levels would be high when a strong task orientation was paired with a strong performance climate. Against predictions, there were no significant interactions for a performance climate and task orientation. For mastery climate and ego orientation, there were significant interactions but these again did not entirely match our hypotheses. In a strong mastery climate, athletes with high levels of ego orientation showed high levels of self-determined motivation (IM Knowledge and IM Accomplishment). In the same climate, athletes with low levels of ego orientation showed similar levels of self-determined motivation, but appeared to have motivational problems when the mastery climate was low.

From these results we might conclude that mastery climate may have a positive influence on athletes with either high or low levels of ego orientation, but a strong mastery climate is particularly important for athletes with low levels of ego orientation. These findings may be at least partially due to there being less conflict between the climate and the dispositional orientation of the athlete, as suggested by the P x E fit hypothesis and Deci and Ryan (1991). An athlete with low levels of ego orientation (i.e., lack of normative referencing) is not in conflict with their environment when in a strong mastery climate (i.e., discourage normative referencing), which appears to be adaptive in terms of self-determined motivation.

A significant interaction was also found for mastery climate and ego orientation on introjected regulation. The nature of this interaction more closely reflected the hypothesised relationship for a mismatched climate with goal orientation on highly self-determined motivation (which introjected regulation is not). Introjected regulation is conceptualised as behaviour engaged in to avoid feelings of guilt (Vallerand, 1992). When an athlete is in a strong mastery climate and has high levels of ego orientation, levels of introjected regulation decreases. This reinforces the positive influence a strong mastery climate may have on an athlete with high levels of ego orientation, in terms of reducing non self-determined motivation. In the same climate, when an athlete has a low level of ego orientation, the level of introjected regulation is very low, reflecting very little conflict.

The absence of significant interactions for achievement goals and motivational climate interactions on tension is in line with past research that has failed to find significant interactions with pressure/tension (Cresswell *et al.*, 2003; Newton & Duda, 1999). In line with the current results, Newton and Duda found a significant main effect for ego orientation on pressure/tension. Interestingly, Cresswell *et al.* found a

significant main effect with mastery climate on pressure/tension, but no significant main effect for ego orientation. Again, these conflicting results may be due to sampling issues.

One limitation of the current study is that perceptions of competence were not measured. Past research has indicated that a high ego orientation may only be detrimental when combined with low levels of perceived competence (Nicholls & Miller, 1985), and so the present results could be confounded by our failure to measure this variable. However, it remains unclear exactly how perceived competence could account for the consistent patterns of interactions obtained.

The results of the present study highlight the importance of examining the interaction effects of achievement goal orientations and motivational climate. When goal orientations have been investigated in isolation, previous findings (Duda *et al.*, 1995; Papaioannou & Kouli, 1999; Theebom, De Knop & Weiss, 1995) have indicated that a high ego orientation may be detrimental (when combined with low levels of perceived competence). However, when considered interactively with performance climate, ego orientation positively predicted several motivational variables high in self-determination. One of the key findings was that a high ego orientation combined with a strong performance climate predicted high levels of IM Knowledge, IM Stimulation, and IM Accomplishment. Those individuals involved in influencing the motivational climate (e.g., coaches, managers) should therefore consider assessing the achievement goal profiles of their athletes and try to create a climate (i.e., performance) that supports/reinforces each athlete's dominant achievement goal (especially when highly ego orientated).

Future research in this area might also consider assessing the athlete's need for social approval. If an individual has a high level of task orientation and also has a

strong need to gain social approval from significant others (e.g., coach, team mates), then the motivational climate may have a greater influence over this individual, compared to an individual with little need for social approval. This need for social approval cannot be measured utilising the two traditional measures of achievement goals (POSQ, Roberts, *et al.,* 1998; TEOSQ, Duda & Nicholls, 1992). Currently, three achievement goal measures are being developed that include Social Goals (Allen, 2003, 2005; Stuntz & Weiss, 2003; Wilson, Harwood & Hardy, in preparation: chapter 2). Future research should attempt to investigate the interactions between achievement goals and motivational climates in conjunction with consideration of social goal orientations.

The current study aimed to examine the influence of interactions between achievement goal orientations and motivational climate on motivation and tension. Results showed equivocal support for the hypotheses. Interaction results suggested that performance climate exerted a positive effect on the intrinsic motivation of high ego oriented athletes, but a negative effect on the intrinsic motivation of low ego oriented athletes; mastery climate exerted a more positive effect on the intrinsic motivation of low ego oriented athletes compared to high ego oriented athletes; and the intrinsic motivation of high ego oriented athletes was generally higher than the intrinsic motivation of low ego oriented athletes; a mastery nor performance climate exerted no influence on the motivation or tension of athletes with high or low levels of task orientation. These findings stand in contrast to the findings of previous research in this area.

CHAPTER 5

SOCIAL APPROVAL: DOES IT MODERATE THE MOTIVATIONAL CLIMATE AND ACHIEVEMENT GOAL ORIENTATION RELATIONSHIP?

Abstract

The present study investigated the interactive effects of self-directed achievement goals, social approval achievement goals, and motivational climate upon motivation and tension. Two hundred and one athletes with ages ranging from 16 to 34 years (x = 21.59; SD = 3.05) from a range of competitive levels and sports participated in the study. The Profile of Goal Orientation Questionnaire (PGOQ; Harwood *et al.,* 2002: chapter 2; Wilson *et al.,* in preparation: chapter 2), the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton *et al.,* 2000), the Sport Motivation Scale (SMS; Pelletier *et al.,* 1995) and the modified Profile of Mood States (POMS-A; Terry, *et al.,* 1999) were used to measure achievement goals, motivational climate, motivation, and tension, respectively. Significant interactions emerged for Self-directed Ego, Social Approval Ego, and Performance Climate, on Tension and Identified Regulation. Significant Interactions also emerged for Self-directed Task, Social Approval Ego, and Performance Climate, on Intrinsic Motivation (IM) to Experience Stimulation and Amotivation. Finally, a significant interaction emerged for Self-directed Ego, Social Approval Task, and Mastery Climate, on IM to Experience Stimulation. The interactions suggested that: (1) in a strong performance climate, high levels of self-directed ego coupled with low levels of social approval ego appear beneficial with regards to self-determined motivation; (2) high levels of self-directed task appear to protect against the potentially negative influence of high levels of social approval ego in a strong performance climate; (3) in a strong mastery climate, high levels of self-directed ego and social approval task appear to be beneficial. Applied implications are discussed.

Achievement Goal Theory (Nicholls, 1984, 1989) has provided a structure for examining achievement behaviour in sport since Duda (1987) adapted the education-based theory to this context. Nicholls' (1984, 1989) theory suggested that individuals and situations interact to establish the achievement goal profile that the individual adopts in various achievement contexts. Previous research investigating the relationship between achievement goal orientations and situational characteristics (motivational climate) in which athletes perform (Kanussanu & Roberts, 1996; Ommundsen, Roberts & Kavussanu, 1998; Seifriz, Duda & Chi, 1992) has primarily focused on goal orientations or climates, or even their combined effects, but not on their interactions. The present study investigates the moderating role of social approval on the interaction between achievement goals and motivational climate in sporting contexts.

According to Nicholls' (1984, 1989) Achievement Goal Theory, the demonstration of competence within achievement contexts underpins conceptions of success. Nicholls (1984) suggested that competence is conceptualised in two ways: when gains in personal performance/mastery indicate competence, an individual is *task orientated*; and when demonstrations of superior performance in comparison to others indicate competence, an individual is *ego orientated*. For example, an athlete who is task orientated would feel successful if they improved their performance (self-referenced). An athlete who was ego orientated would feel successful if they outperformed their opponent (norm-referenced).

Ames (1992a, b, c) proposed that the motivational climate influences the meaning of achievement by informing the athlete about what they have to do to maximise achievement. Ames and Archer (1988) suggested that individuals distinguish between mastery (task-involved) and performance (ego-involved) climates

through evaluative practices, reward and punishment structures, and the quality of interpersonal relationships. Studies that have examined the relationship between goal orientations and perceptions of motivational climate have found a strong link (Cresswell, Hodge & Kidman, 2003; Harwood & Swain, 1998; Newton & Duda, 1999; Swain & Harwood, 1996; Treasure & Roberts, 1998). In line with achievement goal theory, findings show that individuals in a mastery climate tend to have high levels of task involvement (Harwood & Swain, 1998; Swain & Harwood, 1996) and individuals in a performance climate tend to have high levels of ego involvement (Harwood & Swain, 1998; Swain & Harwood, 1996).

Roberts (1992) suggested that an athlete with high levels of task orientation who finds him or herself performing in a strong mastery climate would feel comfortable and motivated. However, if that same individual found him or herself in a performance climate, he/she might perceive conflict and experience reduced motivation levels. Roberts made similar predictions regarding an individual with high levels of ego orientation performing in performance and mastery climates. This prediction related to the person-environment (P x E) fit hypothesis (Pervin, 1968). This hypothesis suggested that for each individual there are environments that more or less match his or her personality characteristics. A 'match' is predicted to result in high performance, satisfaction, and low levels of anxiety (Hunt, 1973, Hunt & Sullivan, 1974; Stumpfig, 1975). A 'mismatch' is expected to result in performance decrements, dissatisfaction, and high levels of anxiety.

While there have been studies examining the relationship between achievement goals and motivational climate (e.g., Kanussanu & Roberts, 1996; Ommunsden, Roberts & Kavussanu, 1998; Seifriz, Duda & Chi, 1992), none of these studies have actually examined the interaction effects. Only a small number of

studies have employed statistical analyses that enable the interactive, as well as the additive, effects of achievement goals and motivational climate to be examined (Cresswell *et al.,* 2003; Newton & Duda, 1999; Wilson & Hardy, in preparation: chapter 4).

Specifically examining the P x E fit hypothesis, Newton and Duda (1999) found no interactive effects between achievement goals and motivational climate on several intrinsic motivation variables in junior female volleyball players. Newton and Duda (1999) did find a significant mastery climate and task orientation interaction on the belief that effort leads to success. Volleyball players with high levels of task orientation showed a strong belief that effort leads to success regardless of the level of mastery climate. However, when athletes had low levels of task orientation, the extent to which they believed effort leads to success was dependent upon the strength of the mastery climate (as the climate got more mastery focused, the belief that effort leads to success increased). Newton and Duda utilised the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, Tammen, 1989) to measure intrinsic motivation. However, Markland and Hardy (1997) highlight several concerns regarding the factorial and construct validity of the IMI. Specifically, Markland and Hardy suggested that: (a) the results of model testing procedures conducted by McAuley *et al.* (1989, 1991) were far from optimal; and (b) the hierarchical model underpinning the IMI (McAuley *et al.,* 1989) is conceptually different to the formal propositions of Cognitive Evaluation Theory (Deci & Ryan, 1985).

Cresswell *et al.* (2003) investigated the interactive effects of achievement goals and motivational climate on motivation related variables in junior football players. Results showed that task orientation interacted with mastery climate to predict perceived competence. Football players with high levels of task orientation

showed high levels of perceived competence, regardless of the level of mastery climate. Players with low levels of task orientation showed increased levels of perceived competence as the climate got more mastery focused. Cresswell *et al.* (2003) concluded, "a mastery-oriented climate was of particular importance to an individual's perceptions of competence if they had a low level of task orientation" (p. 20). Cresswell *et al.* also employed the IMI to measure intrinsic motivation. As outlined previously, the factorial and construct validity of this measure has been seriously questioned by Markland and Hardy (1997), which may go some way to explain the equivocal findings of these studies.

Wilson and Hardy (in preparation: chapter 4) investigated the interaction between motivational climate and achievement goals on motivation (intrinsic, extrinsic, and amotivation) and tension in a sample of athletes with a wide age range and participation in a variety of sports. Wilson and Hardy found interactions between ego orientation and performance climate on intrinsic motivation variables. More specifically, athletes who had high levels of ego orientation showed increased levels of Intrinsic Motivation (IM) to Gain Knowledge, IM to Experience Stimulation, and IM to Accomplish as the climate got more performance focused. Athletes with low levels of ego orientation showed decreased levels of IM (3) as the climate got more performance focused. When the performance climate was weak, athletes with low levels of ego orientation consistently had higher IM than athletes with high levels of ego orientation. Wilson and Hardy (in preparation: chapter 4) concluded that a strong performance climate exerted a positive effect on the intrinsic motivation of athletes with high levels of ego orientation, but a negative effect on athletes with low levels of ego orientation. This result is in line with the P x E fit hypothesis (Pervin, 1968) and Roberts (1992). Wilson and Hardy also found significant interactions between

mastery climate and ego orientation on two IM variables. In a strong mastery climate, athletes with high levels of ego orientation showed increased levels of IM to gain knowledge and IM to accomplish. However, athletes with low levels of ego orientation showed even greater increases in the two IM variables when they were in a strong mastery climate. Wilson and Hardy (in preparation: chapter 4) concluded that mastery climates exerted a more positive effect on intrinsic motivation in athletes with low levels of ego orientation compared to athletes with high levels of ego orientation.

While the above findings provide valuable information regarding the impact of the motivational climate on individuals' achievement goals, the results of the three interaction studies are equivocal. To obtain a more accurate picture of how a motivational climate may interact with achievement goal orientations, an athlete's need for social approval should also be considered (Allen, 2003, 2005; Harwood, 1997; Harwood & Swain, 2001, 2002; Harwood, Wilson & Hardy, 2002: chapter 2; Stuntz & Weiss, 2003; Wilson & Hardy, in preparation: chapter 4; Wilson, Harwood & Hardy, in preparation: chapter 2). For example, if an individual has high levels of ego orientation and is performing in a strong mastery climate, this may result in reduced motivation or increased tension, in accordance with Roberts (1992) and the P x E fit hypothesis (Pervin, 1968). However, if the athletes need for social approval is considered, those athletes with a strong need for social approval may be more influenced by the climate (resulting in greater losses of self-determined motivation and increased levels of tension) compared to athletes with little need for social approval (only minor losses of self-determined motivation and slight increases in tension levels).

Recently, current measures of achievement goals in sport have been criticised by Hardy (1997, 1998), Hardy, Jones and Gould (1996), Harwood and Hardy (2001),

and Harwood, Hardy and Swain (2000). As a result of these criticisms, Harwood, Wilson and Hardy (2002: chapter 2) and Wilson, Harwood and Hardy (in preparation: chapter 2) developed a four-factor model of achievement goals, which includes social approval goals. Qualitative and intervention-based research led Harwood (1997) and Harwood and Swain (2001, 2002) to propose that the existing two goal orientations (task and ego) have self-directed (internal) and social approval (external) components. As defined by Harwood *et al* (2002), *Self-directed Task (SDT)* is the internal desire to improve and progress (e.g., prove to myself that I have gained in ability). *Social Approval Task (SAT)* represents the external desire to show others progress (e.g., show others how disciplined and focused I am on improving my performance). *Self-directed Ego (SDE)* is the internal desire to overcome the opponent (e.g., prove to myself that I have skills superior to the opposition). *Social Approval Ego (SAE)* represents the external desire to maximise favourable social comparisons of the performance made by others (e.g., show others that my strengths as a performer are greater than the opposition). Utilisation of this four-factor model of achievement goals enabled the author to investigate the element of social approval, which may have interesting interactive relationships with motivational climate and other self-directed achievement goals. Previous research has found that athletes' perceptions of 'significant others' (e.g., coaches, parents, organisation, sporting heroes) favouring one goal over another has a significant influence on their own achievement goals prior to competition (Harwood & Swain, 1998; Swain & Harwood, 1996).

The present study aimed to investigate the role that the need for social approval may play in the interaction between motivational climate and achievement goals. The dependent variables were motivation (IM to Gain Knowledge, IM to Experience Stimulation, IM to Accomplish; Identified Regulation, Introjected

Regulation, External Regulation, Amotivation) and Tension. Both motivation and tension were included so that Roberts' (1992) proposition could be directly assessed.

Self-Determination Theory (Deci and Ryan, 1985) predicted that athletes seek certain goals through their sport involvement, and these goals are fuelled by three needs: competence (to interact efficiently with the environment), autonomy (desire to be self-initiating), and relatedness (to feel connected to significant others). The theory predicts that opportunities that satisfy athlete's needs, and subsequent goals, will facilitate motivation. Deci and Ryan (1985) proposed a self-determination continuum, along which Intrinsic Motivation to Accomplish, to Gain Knowledge, and to Experience Stimulation were classed as variables high in self-determination (Vallerand, 1992). Identified Regulation, Introjected Regulation, External Regulation, and Amotivation were placed on the continuum towards non-self-determination, with Identified Regulation placed closest to the Intrinsic Motivation variables and Amotivation being at the other end. Vallerand and Losier (1999) hypothesised that when social factors (i.e., motivational climate) support an athlete's needs (competence, autonomy, relatedness), self-determined motivation (Intrinsic Motivation, Identified Regulation) will be high. Alternatively, when social factors do not support an athlete's needs, non-self-determined motivation (Introjected Regulation, External Regulation, Amotivation) would be high.

For the purposes of this study, identified regulation is considered a motivation variable relatively high in self-determination. Identified regulation is defined as when behaviour is "highly valued and judged as important for the individual…it (the behaviour) will be performed freely even if the activity is not pleasant itself" (Vallerand, 1997, p. 281). As identified regulation is the form of extrinsic motivation that is closest to the intrinsic motivation variables on the continuum of self-

determination, the authors consider this motivation variable as one which is relatively high in self-determination.

It was predicted that: 1) athletes who had high levels of self-directed task orientation and high levels of social approval task would show high levels of self-determined motivation and low levels of tension in a strong mastery climate (matched), as the climate reinforced their self-directed and social approval goal orientation and social factors support the athletes needs (Deci & Ryan, 1991); 2) athletes who had high levels of self-directed task and low levels of social approval task would show moderate levels of self-determined motivation and moderate levels of tension in a strong mastery climate, as the climate reinforced their self-directed goal orientation but, as the need for social approval is low, the effect of the climate would not be as great; 3) athletes who had low levels of self-directed task orientation and high levels of social approval task would show moderate to low levels of self-determined motivation and moderate to high levels of tension in a strong mastery climate, as the climate did not reinforce their self-directed goal orientation but the need for social approval was high; 4) athletes with low levels of self-directed task and low levels of social approval task would not be influenced by the mastery climate (low levels of self-determined motivation and tension), as the climate did not reinforce their self-directed goal orientation and the need for social approval was low. The predicted mastery climate, self-directed task orientation and social approval task interaction is represented in figures 1 and 2 below.

It was also predicted that: 1) athletes who had high levels of self-directed task orientation and high levels of social approval ego would show low levels of self-determined motivation and high levels of tension in a strong performance climate (mismatch), because of the P x E conflict and because social factors did not support

the athletes needs (Deci & Ryan, 1991); 2) athletes who had high levels of self-directed task and low levels of social approval ego would show moderate to low levels of self-determined motivation and moderate to high levels of tension in a strong performance climate, as the climate was conflicting with the self-directed goal

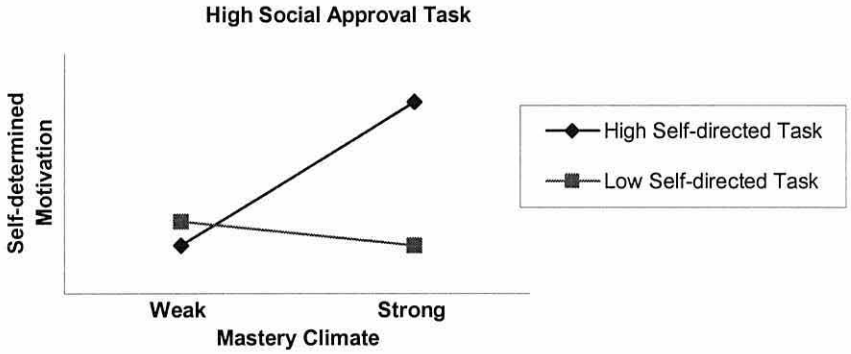

Figure 1. Hypothesised Interaction between Mastery Climate, Self-Directed Task Orientation and High Social Approval Task on Self-Determined Motivation

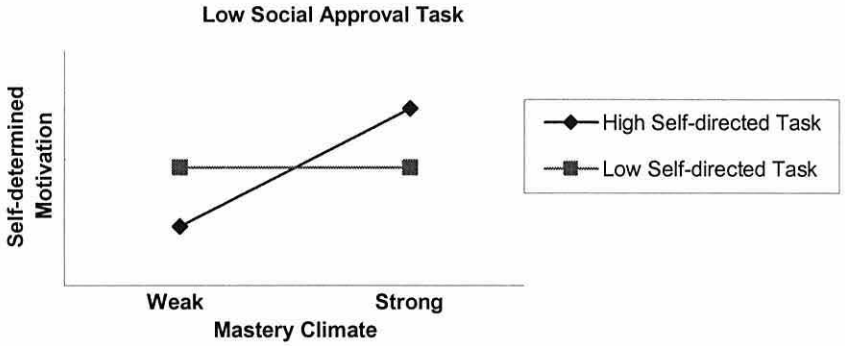

Figure 2. Hypothesised Interaction between Mastery Climate, Self-Directed Task Orientation and Low Social Approval Task on Self-Determined Motivation

orientation but the need for social approval is low; 3) athletes who had low levels of self-directed task and high levels of social approval ego would show moderate levels of self-determined motivation and moderate levels of tension in a strong performance climate, as the climate was not in direct conflict with the athletes self-directed goal orientation but the need for social approval is high; 4) athletes with low levels of self-directed task orientation and low levels of social approval ego would not be

influenced by the performance climate (low levels of self-determined motivation and tension). The predicted relationship between a performance climate, self-directed task orientation and social approval ego is represented in figures 3 and 4 below.

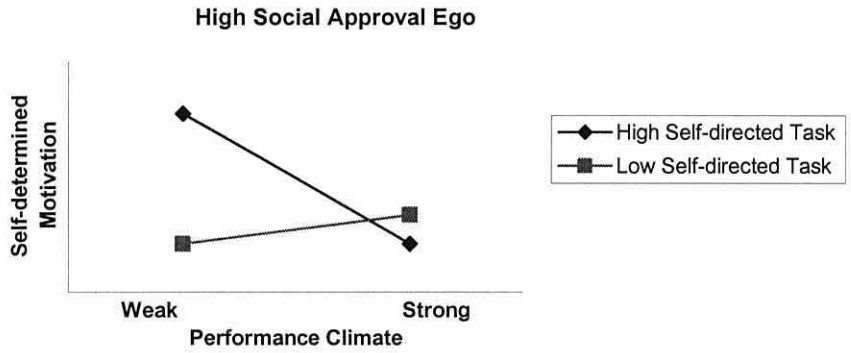

Figure 3. Hypothesised Interaction between Performance Climate, Self-Directed Task Orientation and High Social Approval Ego on Self-Determined Motivation

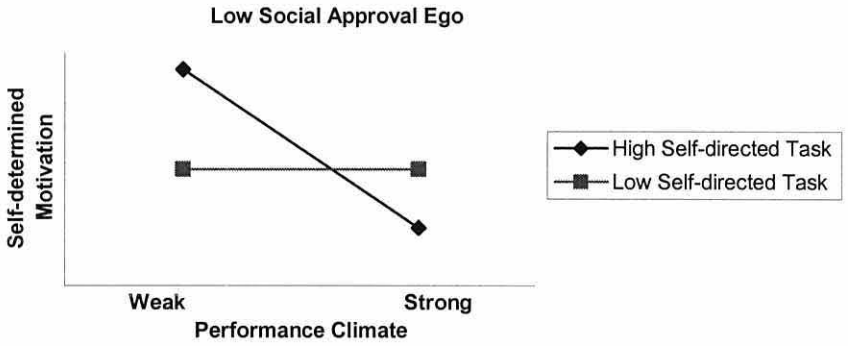

Figure 4. Hypothesised Interaction between Performance Climate, Self-Directed Task Orientation and Low Social Approval Ego on Self-Determined Motivation

Finally, we predicted comparable interactions for the combined effects of self-directed ego orientation, social approval ego and performance climate and self-directed ego, social approval task and mastery climate. While no interactions were found for a task goal orientation and mastery climate in chapter 4, as the present study utilises a measure of task orientation that is not confounded with hypothesised behavioural correlates of a task orientation, it was hypothesised that their would be self-directed task and mastery climate interactions.

Method

Participants

Two hundred and one athletes participated in the study. There were 133 males and 68 females with ages ranging from 16 to 34 years (x = 21.59; SD = 3.05). Participants had been with the same coach for a mean of 2.85 years and the same team for a mean of 3.51 years. Athletes competed in a variety of sports (e.g., rugby, football, netball, basketball, lacrosse, athletics, hockey, martial arts) at school (n = 10), club (n = 64), regional (n = 78), national (n = 27), and international (n = 22) levels.

Procedure

The author approached coaches and clubs to outline the study and gain permission to approach players to participate in the study. Once permission was granted, the researcher (or trained assistants) approached athletes/teams prior to a training session and explained the nature of the study. Participants were then asked to sign an informed consent form (parental consent was also sought for athletes under 18 years of age), were made aware that they could withdraw from the study at any time without penalty, and were told that all the information given would remain confidential. Inclusion criteria for the study were that participants must: (a) have been with the same coach/team for longer than 3 months; and (b) must be over 16 year of age. The rationale for inclusion criteria (a) was so the motivational climate had had enough time to have a potential influence over participants. The rationale for inclusion criteria (b) was to ensure that each participant's dispositional achievement goal orientations were developmentally well established (Nicholls, 1989). Participants then completed a small battery of questionnaires that took approximately 30 minutes to finish. In return for participating in the study, athletes/teams were offered a workshop on motivation/goal setting and were sent a summary of the results.

Measures

Goal Orientations. The Profile of Goal Orientation Questionnaire (PGOQ; Wilson, Harwood & Hardy, in preparation: chapter 2) was utilised to measure achievement goals. This 20-item questionnaire was developed to measure Self-directed Task (6 items), Self-directed Ego (5 items), Social Approval Task (4 items) and Social Approval Ego (5 items). Participants responded to the stem 'I feel successful in my sport if...' on a 6-point Likert scale (1 = never true; 6 = often true). The scales have demonstrated excellent reliability; 0.76, 0.88, 0.84 and 0.92 for Self-directed Task, Self-directed Ego, Social Approval Task, and Social Approval Ego, respectively (Wilson *et al.,* in preparation: chapter 2). Wilson *et al.* conducted a confirmatory factor analysis, and concluded that the fit statistics were very good (χ^2 = 475.44 (p<.05), RMSEA = .05, CFI = .98, NNFI = .98, SRMR = .06). However, correlations between some of the goal orientation subscales were very high (r = .32 to .93).

Motivational Climate. The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton, Duda & Yin, 2000) was used to assess the athlete's perceptions of the motivational climate. This is a 33-item questionnaire developed to measure Mastery Climate (Important Role, Cooperative Learning, and Effort/Improvement) and Performance Climate (Intra-team Member Rivalry, Punishment for Mistakes, and Unequal Recognition). Seventeen items relate to a Mastery Climate and 16 items relate to a Performance Climate. Participants are asked to respond to the stem "circle the number which best represents how you feel..." on a 5-point Likert scale (1 = strongly disagree; 5 strongly agree). The Mastery Climate (α = 0.88) and Performance Climate (α = 0.87) scales have shown excellent reliability (Newton *et al.,* 2000). Newton and Duda (1997) utilised structural equation

modelling to test the factor structure of the PMCSQ-2 and interpreted the findings as suggesting the two-factor model had an acceptable fit (GFI = .87, RMSR = .07)[4]. However, these fit statistics are below currently recommended levels (Hu & Bentler, 1999).

Motivation. The Sport Motivation Scale (SMS; Pelletier, Fortier, Vallerand, Tuson, Briere, & Blais, 1995) was used to assess motivation. This 28-item questionnaire measures Intrinsic Motivation (To Accomplish, To gain Knowledge, To Experience Stimulation), Extrinsic Motivation (Identified, Introjected, External Regulation) and Amotivation. Four items represented each subscale. Participants are asked to respond to each item from the stem "why are you presently practicing your sport?" and responded on a 7-point Likert scale (1 = Does not correspond at all; 4 = Corresponds moderately; 7 = corresponds exactly). The scales have shown acceptable internal consistency in previous research (α = 0.63 to 0.80; Pelletier *et al.,* 1995). Pelletier *et al.* (1995) conducted a CFA to test the factorial validity of the SMS and concluded that the fit indices were acceptable (GFI = .94, RMSR = .05, NFI = .92)[5]. Li and Harmer (1996) conducted a CFA on male and female samples and also reported acceptable fit indices [male (n = 442); x^2/d.f = 3.84, CFI = .98, RMSEA = .08; female (n = 415); x^2/d.f = 3.41, CFI = .99, RMSEA = .08][6].

Tension. The Profile of Mood States - A (POMS - A; Terry, Lane, Lane & Keohane, 1999) was used to measure tension. From this 24-item questionnaire, a shortened version of the original POMS (McNair *et al.,* 1981), we selected four items designed to measure Tension (Anxious, Nervous, Panicky, and Worried). Participants responded to the stem "how you feel about your sport in general" on a 5-point Likert

[4] These were the only fit statistics reported in the Newton and Duda (1997) paper
[5] These were the only fit statistics reported in the Pelletier et al (1995) paper
[6] These were the only fit statistics reported in the Li and Harmer (1996) paper

scale (1 = not at all; 5 = extremely). The scales have shown good internal consistency, with the six factors (Tension, Depression, Anger, Vigour, Fatigue, and Confusion) ranging from 0.74 to 0.91 (Terry *et al.,* 1996). Terry *et al.* suggested that the confirmatory analysis yielded acceptable fit indices for the 24-item version (CFI = .93, NNFI = .92, RMSEA = .06)[7].

Results

Descriptive Statistics

The means and standard deviations for all the variables are displayed in Table 1.

Internal Reliability

The internal reliability of all scales reached acceptable levels (.70; Nunnally, 1978) and ranged from 0.73 to 0.92 (see Table 1). Correlations between all 14 variables are displayed in Table 2.

[7] These were the only fit statistics presented in the Terry et al (1996) paper

Table 1

Descriptive Statistics and Alphas for Motivation, Tension, Goal Orientations and Motivational Climate Variables

	N	Mean	SD	α
Motivation Variables				
Intrinsic Motivation to gain Knowledge	201	4.76	1.07	.78
Intrinsic Motivation to Accomplish	201	5.37	1.08	.85
Intrinsic Motivation to Experience Stimulation	201	5.11	1.12	.78
Identified Regulation	200	4.35	1.19	.75
Introjected Regulation	201	4.12	1.28	.78
External Regulation	201	3.74	1.23	.74
Amotivation	201	2.05	1.17	.82
Tension	201	2.15	0.78	.78
Motivational Climate				
Mastery Climate	201	3.91	0.64	.92
Performance Climate	200	2.62	0.73	.89
Goal Orientations				
Self-directed Task	201	4.51	0.86	.87
Self-directed Ego	201	3.70	0.93	.82
Social Approval Task	201	3.91	0.81	.73
Social Approval Ego	201	3.60	0.95	.88

Table 2

Pearson Correlations between all 14 Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Self-directed Task Goal Orientation	1.00													
2. Self-directed Ego Goal Orientation	.29**	1.00												
3. Social Approval Task Goal Orientation	.41**	.64**	1.00											
4. Social Approval Ego Goal Orientation	.12	.82**	.65**	1.00										
5. Mastery Climate	.31**	-.12	.09	-.16*	1.00									
6. Performance Climate	-.12	.29**	.14	.30**	-.54**	1.00								
7. IM Knowledge	.40**	.13	.25**	.08	.38**	-.08	1.00							
8. IM Stimulation	.24**	.15*	.20**	.23**	.27**	-.04	.55**	1.00						
9. IM Accomplishment	.39**	.15*	.26**	.15*	.34**	-.14*	.76**	.71**	1.00					
10. Identified Regulation	.05	-.07	.11	-.09	.39**	-.12	.38**	.37**	.36**	1.00				
11. Introjected Regulation	-.02	.25**	.11	.25**	-.13	.22**	.06	.12	.12	.18*	1.00			
12. External Regulation	-.11	.32**	.30**	.40**	-.04	.29**	.16*	.20*	.16*	.40**	.65**	1.00		
13. Amotivation	-.28**	-.00	-.11	-.06	-.35**	.38**	-.29**	-.45**	-.48**	-.13	.20**	.16*	1.00	
14. Tension	-.06	.07	.03	.13	-.13	.20**	.07	.13	.11	.05	.30**	.20**	.08	1.00

NB. * = $p < .05$; ** = $p < .01$

Preliminary ANOVA's for Age, Gender and Performance Level

Multiple analyses of variance were conducted for age, gender and performance level on dependent and independent variables. For age, participants were put into one of three groups (<20; 21-22; 23+). Age groups were decided based on attaining approximately equal number of participants within each group. For independent variables, only performance climate showed significant differences with regards to age [F (2,199) = 6.00, p = .003]. There were no significant differences for any other independent variables for age, gender and performance level. For dependent variables, only IM to Accomplish showed significant differences with regards to performance level [F (4, 200) = 3.83, p = .005]. All other ANOVA results for dependent variables for age, gender, or performance level were non-significant. As the vast majority of ANOVA results for both dependent and independent variables were non-significant, the data for age, gender, and performance level was pooled for the rest of the analyses.

The Effect of Matched Motivational Climate, Self-Directed Goal Orientation, and Social Approval on Motivation and Tension

Moderated Hierarchical regression analysis was utilised to determine how a matched motivational climate, self-directed achievement goal and social approval achievement goal interacted to influence motivation variables and tension. Bonferonni adjustments were not made to the alpha level within the regression analysis, as the authors were interested in theoretically driven patterns of differences. Clearly, the probability of obtaining and accepting repeated patterns of theoretically predicted significant relationships within a series of regression analyses, when no such relationships exist, is minimal (certainly less than the normal alpha level of p = .05). Consequently, it was considered reasonable not to utilise bonferonni adjustments to control for type I error

within the regression analyses. Regression entry was as follows: Goal Orientation; Social Approval (matched with climate); Motivational Climate; Goal Orientation x Social Approval; Goal Orientation x Motivational Climate; Social Approval x Motivational Climate; Goal Orientation x Motivational Climate x Social Approval. The rationale for matching social approval with climate (e.g., Social Approval Task with Mastery Climate and Social Approval Ego with Performance Climate), regardless of whether the self-directed orientation was task or ego, was that if an individual had high levels of Social Approval Task and was performing in a Mastery Climate, this would strengthen the interaction with the Self-directed Achievement Goal. Conversely, an athlete with high levels of Social Approval Ego performing in a Mastery Climate may have tension and losses in self-determined motivation due to conflict in this area, confounding any conflict with self-directed achievement goals. Prior to analysis, each independent and dependent variable was standardised to ensure common scaling (Tabachnick & Fidell, 1996) and unstandardised B-coefficients were used in the interpretation (Jaccard & Turrisi, 2003). Regression plots were derived following guidelines outlined by Jaccard and Turrisi (2003).

Self-directed Task, Social Approval Task and Mastery Climate

Regression results are displayed in Table 3. Self-directed Task showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Knowledge, IM Stimulation, IM Accomplishment, and Amotivation. For IM Knowledge, IM Stimulation, and IM Accomplishment, the B-coefficients were positive. For Amotivation, the B-coefficient was negative. Social Approval Task had a significant main effect (significant R^2_{change}) on External Regulation. The B-coefficient was positive. Mastery Climate had significant main effects (significant R^2_{change}) on IM Knowledge, IM Stimulation, IM Accomplishment, Identified Regulation,

and Amotivation. For IM Knowledge, IM Stimulation, IM Accomplishment, and Identified Regulation, B-coefficients were positive. For Amotivation, the B-coefficient was negative. There were no significant 2-way interactions between Self-directed Task and Social Approval Task. Social Approval Task and Mastery Climate had significant 2-way interactions (significant R^2_{change}) on Introjected Regulation and External Regulation. There were no significant 2-way interactions between Self-directed Task and Mastery Climate. See Figures 5 to 7 for illustrations of these 2-way interactions. There were no significant 3-way interactions between self-directed task, social approval task, and mastery climate on any dependent variable.

Table 3

Moderated Hierarchical Regression Analysis for Self-directed Task, Social Approval Task and Mastery Climate

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Knowledge						
Self-directed Task	.16	37.79	.000	1, 199	.40	.000
Social Approval Task	.01	2.36	.13	1, 198	.11	.13
Mastery Climate	.07	19.07	.000	1, 197	.29	.000
Self-directed Task*Social Approval Task	.00	.75	.39	1, 196	.04	.39
Self-directed Task*Mastery Climate	.01	2.00	.16	1, 195	-.07	.16
Social Approval Task*Mastery Climate	.00	.02	.90	1, 194	.01	.89
Self-directed Task*Social Approval Task* Mastery Climate	.00	.09	.76	1, 193	.01	.76
IM Stimulation						
Self-directed Task	.06	11.78	.001	1, 199	.24	.001
Social Approval Task	.01	2.82	.10	1, 198	.13	.10
Mastery Climate	.05	10.33	.002	1, 197	.23	.002
Self-directed Task*Social Approval Task	.00	.91	.34	1, 196	-.05	.34
Self-directed Task*Mastery Climate	.00	.84	.36	1, 195	-.05	.36
Social Approval Task*Mastery Climate	.00	.79	.37	1, 194	.08	.37
Self-directed Task*Social Approval Task* Mastery Climate	.01	2.71	.10	1, 193	.08	.10

Cont...

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Accomplishment						
Self-directed Task	.15	35.49	.000	1, 199	.39	.000
Social Approval Task	.01	3.19	.08	1, 198	.13	.08
Mastery Climate	.06	14.43	.000	1, 197	.25	.000
Self-directed Task*Social Approval Task	.00	.11	.74	1, 196	.02	.74
Self-directed Task*Mastery Climate	.01	1.33	.25	1, 195	-.06	.25
Social Approval Task*Mastery Climate	.00	.59	.44	1, 194	.06	.44
Self-directed Task*Social Approval Task* Mastery Climate	.00	.08	.78	1, 193	.01	.78
Identified Regulation						
Self-directed Task	.00	.47	.49	1, 198	.05	.49
Social Approval Task	.01	3.08	.15	1, 197	.11	.15
Mastery Climate	.16	38.50	.000	1, 196	.42	.000
Self-directed Task*Social Approval Task	.00	.08	.78	1, 195	-.02	.78
Self-directed Task*Mastery Climate	.00	.04	.85	1, 194	-.01	.85
Social Approval Task*Mastery Climate	.00	.02	.90	1, 193	.01	.98
Self-directed Task*Social Approval Task* Mastery Climate	.01	1.07	.30	1, 192	-.05	.30
Introjected Regulation						
Self-directed Task	.00	.11	.74	1, 199	-.02	.74
Social Approval Task	.02	3.65	.06	1, 198	.15	.06
Mastery Climate	.02	3.32	.07	1, 197	-.13	.07
Self-directed Task*Social Approval Task	.00	.00	.98	1, 196	.00	.98
Self-directed Task*Mastery Climate	.00	.00	.99	1, 195	.00	.99
Social Approval Task*Mastery Climate	.08	17.28	.000	1, 194	-.36	.000
Self-directed Task*Social Approval Task* Mastery Climate	.02	3.44	.07	1, 193	.09	.07

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
External Regulation						
Self-directed Task	.01	2.40	.12	1, 199	-.11	.12
Social Approval Task	.15	34.24	.000	1, 198	.42	.000
Mastery Climate	.00	.02	.89	1, 197	.01	.89
Self-directed Task*Social Approval Task	.00	.09	.77	1, 196	-.02	.77
Self-directed Task*Mastery Climate	.00	.02	.89	1, 195	.01	.89
Social Approval Task*Mastery Climate	.04	9.63	.00	1, 194	-.25	.002
Self-directed Task*Social Approval Task* Mastery Climate	.00	.01	.94	1, 193	-.00	.94
Amotivation						
Self-directed Task	.08	16.83	.000	1, 199	-.28	.000
Social Approval Task	.00	.00	.96	1, 198	.00	.96
Mastery Climate	.08	17.49	.000	1, 197	-.29	.000
Self-directed Task*Social Approval Task	.00	1.01	.32	1, 196	.05	.32
Self-directed Task*Mastery Climate	.01	2.54	.11	1, 195	.09	.11
Social Approval Task*Mastery Climate	.02	4.21	.04	1, 194	-.17	.04
Self-directed Task*Social Approval Task* Mastery Climate	.01	1.16	.28	1, 193	-.05	.28
Tension						
Self-directed Task	.00	.62	.43	1, 199	-.06	.43
Social Approval Task	.00	.67	.42	1, 198	.06	.42
Mastery Climate	.01	2.56	.11	1, 197	-.12	.11
Self-directed Task*Social Approval Task	.00	.77	.38	1, 196	-.05	.38
Self-directed Task*Mastery Climate	.00	.26	.61	1, 195	.03	.61
Social Approval Task*Mastery Climate	.01	2.20	.14	1, 194	-.13	.14
Self-directed Task*Social Approval Task* Mastery Climate	.01	1.12	.29	1, 193	.05	.29

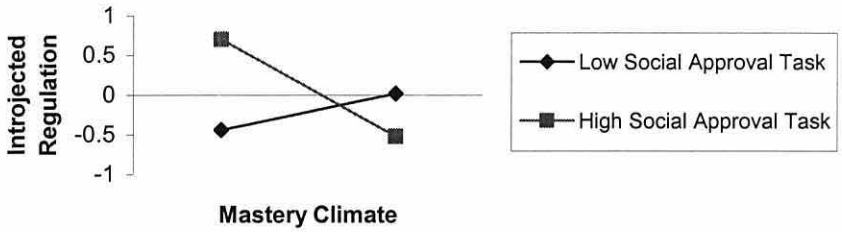

Figure 5. Interaction of Mastery Climate and Social Approval Task on Introjected Regulation

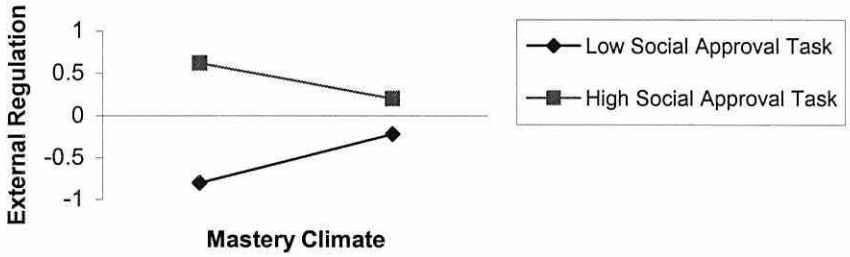

Figure 6. Interaction of Mastery Climate and Social Approval Task on External Regulation

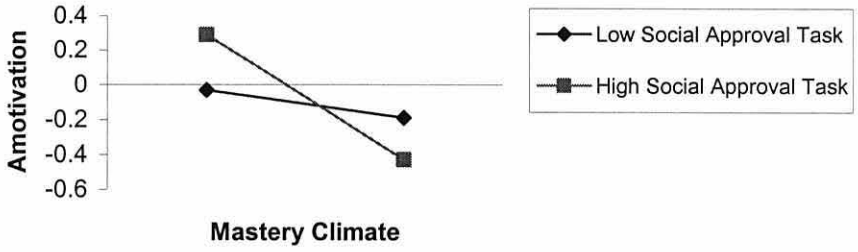

Figure 7. Interaction of Mastery Climate and Social Approval Task on Ammotivation

Self-directed Ego, Social Approval Ego and Performance Climate

Regression results are displayed in Table 4. Self-directed Ego had significant main effects (significant R^2_{change}) on the following dependent variables: IM Stimulation, IM Accomplish, Introjected Regulation, and External Regulation. In all cases, the B-coefficients were positive. Social Approval Ego had significant main effects (significant R^2_{change}) on IM Stimulation and External Regulation. In both cases, the B-coefficients were positive. Performance Climate had significant main effects (significant R^2_{change}) on IM Accomplishment, Introjected Regulation, External Regulation, and Amotivation. For IM Accomplishment, the B-coefficient was negative. For Introjected Regulation, External Regulation, and Amotivation, the B-coefficients were positive. Self-directed Ego and Social Approval Ego had a significant 2-way interaction (significant R^2_{change}) on Introjected Regulation. There were no significant 2-way interactions between Self-directed Ego and Performance Climate. Social Approval Ego and Performance Climate had significant 2-way interactions (significant R^2_{change}) on Identified Regulation and Tension. See Figures 8 to 10 for illustrations of these 2-way interactions.

Table 4

Moderated Hierarchical Regression Analysis for Self-directed Ego, Social Approval Ego and Performance Climate

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Knowledge						
Self-directed Ego	.02	4.51	.07	1, 198	.13	.07
Social Approval Ego	.00	.65	.42	1, 197	-.10	.42
Performance Climate	.02	2.78	.10	1, 196	-.12	.10
Self-directed Ego*Social Approval Ego	.00	.13	.72	1, 195	-.02	.72
Self-directed Ego*Performance Climate	.00	.90	.34	1, 194	.07	.34
Social Approval Ego*Performance Climate	.01	1.26	.26	1, 193	.14	.26
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.04	.84	1, 192	.01	.84
IM Stimulation						
Self-directed Ego	.02	4.51	.04	1, 198	.15	.04
Social Approval Ego	.03	6.36	.01	1, 197	.31	.01
Performance Climate	.01	2.46	.12	1, 196	-.11	.12
Self-directed Ego*Social Approval Ego	.00	.64	.42	1, 195	-.04	.42
Self-directed Ego*Performance Climate	.01	1.82	.18	1, 194	.10	.18
Social Approval Ego*Performance Climate	.01	1.51	.22	1, 193	.15	.22
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.86	.36	1, 192	-.05	.36

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Accomplishment						
Self-directed Ego	.02	4.70	.03	1, 198	.15	.03
Social Approval Ego	.00	.18	.67	1, 197	.05	.67
Performance Climate	.04	8.26	.00	1, 196	-.21	.01
Self-directed Ego*Social Approval Ego	.00	.02	.88	1, 195	-.01	.88
Self-directed Ego*Performance Climate	.01	2.71	.10	1, 194	.21	.10
Social Approval Ego*Performance Climate	.01	2.91	.09	1, 193	.21	.09
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.39	.53	1, 192	-.04	.53
Identified Regulation						
Self-directed Ego	.01	1.00	.32	1, 197	-.07	.32
Social Approval Ego	.00	.59	.45	1, 196	- .10	.45
Performance Climate	.01	1.77	.19	1, 195	-.10	.19
Self-directed Ego*Social Approval Ego	.02	3.60	.06	1, 194	-.09	.06
Self-directed Ego*Performance Climate	.00	.01	.94	1, 193	.01	.94
Social Approval Ego*Performance Climate	.02	3.97	.05	1, 192	-.25	.05
Self-directed Ego*Social Approval Ego* Performance Climate	.04	9.16	.00	1, 191	-.17	.003
Introjected Regulation						
Self-directed Ego	.07	13.66	.00	1, 198	.25	.000
Social Approval Ego	.01	1.26	.26	1, 197	.14	.26
Performance Climate	.02	4.48	.04	1, 196	.15	.04
Self-directed Ego*Social Approval Ego	.03	6.61	.01	1, 195	.12	.01
Self-directed Ego*Performance Climate	.01	2.41	.12	1, 194	.11	.12
Social Approval Ego*Performance Climate	.01	2.80	.10	1, 193	.20	.10
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.00	.99	1, 192	-.00	.99

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
External Regulation						
Self-directed Ego	.10	22.16	.000	1, 198	.32	.000
Social Approval Ego	.06	14.61	.000	1, 197	.44	.000
Performance Climate	.03	7.01	.01	1, 196	.18	.01
Self-directed Ego*Social Approval Ego	.01	1.75	.19	1, 195	.06	.19
Self-directed Ego*Performance Climate	.00	.72	.40	1, 194	.06	.40
Social Approval Ego*Performance Climate	.00	.01	.91	1, 193	-.01	.91
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.02	.89	1, 192	.01	.89
Amotivation						
Self-directed Ego	.00	.01	.93	1, 198	-.01	.93
Social Approval Ego	.01	1.35	.25	1, 197	-.14	.25
Performance Climate	.17	41.06	.000	1, 196	.43	.000
Self-directed Ego*Social Approval Ego	.00	.43	.51	1, 195	.03	.51
Self-directed Ego*Performance Climate	.00	.59	.44	1, 194	-.05	.44
Social Approval Ego*Performance Climate	.00	.29	.59	1, 193	-.06	.59
Self-directed Ego*Social Approval Ego* Performance Climate	.00	.00	.99	1, 192	.00	1.00
Tension						
Self-directed Ego	.01	.91	.34	1, 198	-.07	.34
Social Approval Ego	.02	3.74	.06	1, 197	.24	.06
Performance Climate	.03	5.84	.02	1, 196	.18	.02
Self-directed Ego*Social Approval Ego	.01	1.10	.32	1, 195	.05	.32
Self-directed Ego*Performance Climate	.00	.00	.98	1, 194	.00	.98
Social Approval Ego*Performance Climate	.02	4.65	.03	1, 193	.26	.03
Self-directed Ego*Social Approval Ego* Performance Climate	.02	3.92	.05	1, 192	.11	.05

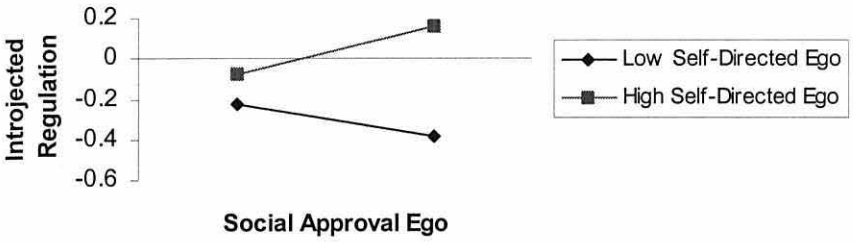

Figure 8. Interaction w ith Self-Directed Ego and Social Approval Ego on Introjected Regulation

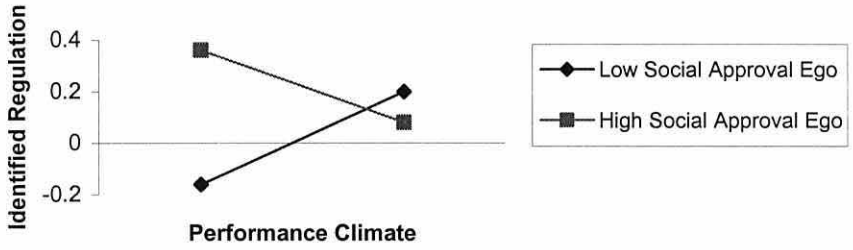

Figure 9. Interaction with Social Approval Ego and Performance Climate on Identified Regulation

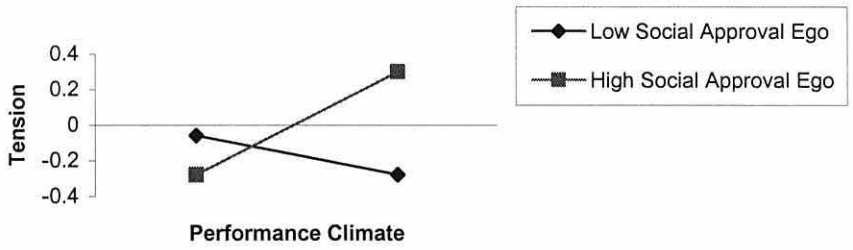

Figure 10. Interaction with Social Approval Ego and Performance Climate on Tension

Self-directed Ego, Social Approval Ego, and Performance Climate had significant 3-way interactions (significant R^2 change) on Tension and Identified Regulation. The nature of these interactions is illustrated in Figures 11 to 14, from which it can be seen that a strong performance climate appears problematic (increased tension levels) for athletes with low levels of self-directed ego who have either low or high levels of

social approval ego. The combination of high self-directed ego and high social approval ego was also problematic in a strong performance climate. The only combination that appears to predict reduced levels of tension is when an athlete performs in a strong performance climate and has high levels of self-directed ego and low levels of social approval ego. A similar pattern emerges for identified regulation. Again, the only combination that predicts increased levels of identified regulation in a strong performance climate is when the athlete has high levels of self-directed ego and low levels of social approval ego.

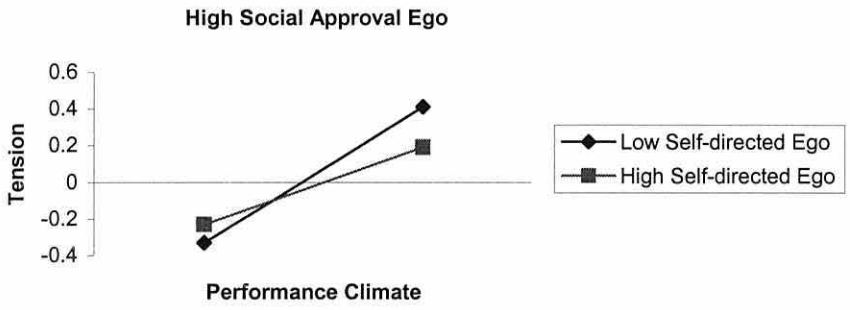

Figure 11. High Social Approval Ego, Self-directed Ego and Performance Climate Interaction on Tension

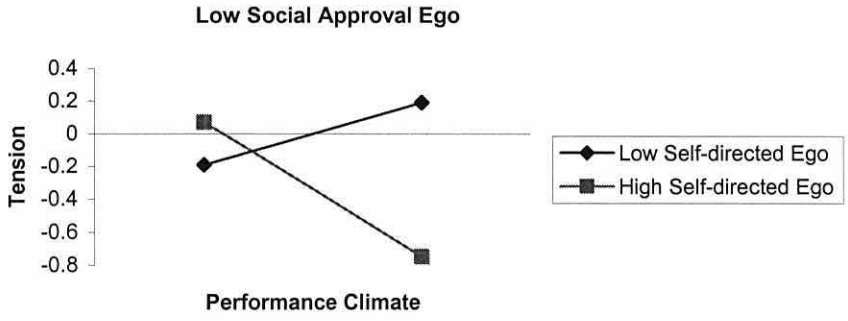

Figure 12. Low Social Approval Ego, Self-directed Ego and Performance Climate Interaction on Tension

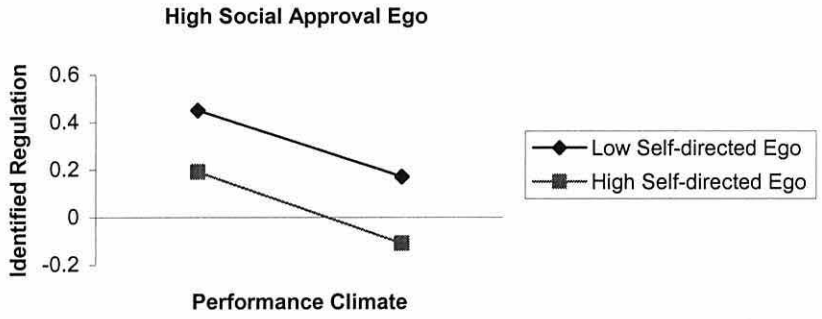

Figure 13. High Social Approval Ego, Self-directed Ego and Performance Climate Interaction on Identified Regulation

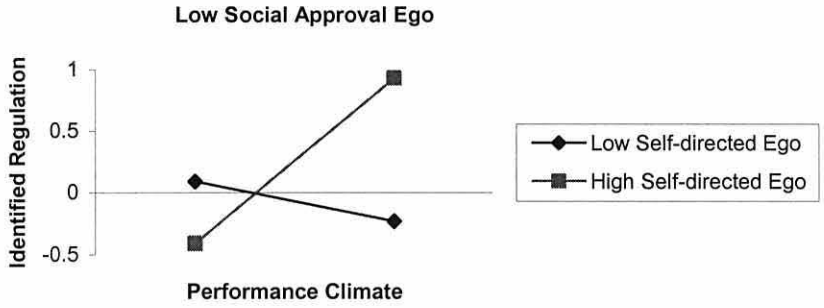

Figure 14. Low Social Approval Ego, Self-directed Ego and Performance Climate Interaction on Identified Regulation

The Effect of Mismatched Motivational Climate, Self-Directed Goal Orientations, and Social Approval on Motivation and Tension

Moderated Hierarchical regression analysis was utilised to determine how a mismatched motivational climate, self-directed achievement goals, and social approval achievement goals interact to influence motivation variables and tension. Again, all variables were standardised prior to analysis and unstandardised B-coefficients were used in the interpretation.

Self-directed Task, Social Approval Ego and Performance Climate

Regression results are displayed in Table 5. As previously, Self-directed Task showed significant main effects (significant R^2_{change}) on the following dependent variables: IM Knowledge, IM Stimulation, IM Accomplishment, and Amotivation. For IM Stimulation, IM Knowledge, and IM Accomplishment, the B-coefficients were positive. For Amotivation, the B-coefficient was negative. Social Approval Ego showed significant main effects (significant R^2_{change}) on IM Stimulation, Introjected Regulation, External Regulation, and Tension. In all cases, B-coefficients were positive. Performance Climate showed significant main effects (significant R^2_{change}) on IM Accomplishment, Introjected Regulation, External Regulation, Amotivation, and Tension. For IM Accomplishment, the B-coefficient was negative. For Introjected Regulation, External Regulation, Amotivation, and Tension, the B-coefficients were positive. Self-directed Task and Social Approval Ego had a significant 2-way interaction (significant R^2_{change}) on Amotivation. Self-directed Task and Performance Climate had significant 2-way interactions (significant R^2_{change}) on External Regulation and Amotivation. Social Approval Ego and Performance Climate had a significant 2-way interaction (significant R^2_{change}) on Introjected Regulation. See figures 15 to 17 for illustrations of the 2-way interactions.

Table 5

Moderated Hierarchical Regression Analysis for Self-directed Task, Social Approval Ego and Performance Climate

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Knowledge						
Self-directed Task	.16	37.53	.000	1, 198	.40	.000
Social Approval Ego	.00	.16	.69	1, 197	.03	.70
Performance Climate	.00	.47	.50	1, 196	-.05	.50
Self-directed Task*Social Approval Ego	.01	1.34	.25	1, 195	.07	.25
Self-directed Task*Performance Climate	.00	.12	.73	1, 194	.03	.73
Social Approval Ego*Performance Climate	.00	.84	.36	1, 193	.06	.36
Self-directed Task*Social Approval Ego* Performance Climate	.00	.35	.55	1, 192	-.04	.55
IM Stimulation						
Self-directed Task	.05	11.39	.00	1, 198	.23	.001
Social Approval Ego	.04	8.29	.00	1, 197	.20	.004
Performance Climate	.01	1.38	.24	1, 196	-.09	.24
Self-directed Task*Social Approval Ego	.00	.08	.77	1, 195	-.02	.77
Self-directed Task*Performance Climate	.00	.42	.52	1, 194	.05	.52
Social Approval Ego*Performance Climate	.01	1.66	.20	1, 193	.09	.20
Self-directed Task*Social Approval Ego* Performance Climate	.03	7.18	.01	1, 192	-.19	.01

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Accomplishment						
Self-directed Task	.15	34.74	.000	1, 198	.39	.000
Social Approval Ego	.01	2.16	.14	1, 197	.16	.14
Performance Climate	.02	4.34	.04	1, 196	-.14	.04
Self-directed Task*Social Approval Ego	.00	.22	.64	1, 195	.03	.64
Self-directed Task*Performance Climate	.01	1.11	.29	1, 194	.08	.29
Social Approval Ego*Performance Climate	.01	3.33	.07	1, 193	.12	.07
Self-directed Task*Social Approval Ego* Performance Climate	.01	1.12	.29	1, 192	-.07	.29
Identified Regulation						
Self-directed Task	.00	.41	.52	1, 197	.05	.52
Social Approval Ego	.01	1.81	.18	1, 196	-.10	.18
Performance Climate	.01	1.46	.23	1, 195	-.09	.23
Self-directed Task*Social Approval Ego	.01	1.25	.27	1, 194	.09	.27
Self-directed Task*Performance Climate	.00	.74	.39	1, 193	.05	.39
Social Approval Ego*Performance Climate	.01	2.62	.11	1, 192	-.12	.11
Self-directed Task*Social Approval Ego* Performance Climate	.00	.04	.85	1, 191	.01	.85
Introjected Regulation						
Self-directed Task	.00	.08	.78	1, 198	-.02	.78
Social Approval Ego	.07	13.96	.000	1, 197	.26	.000
Performance Climate	.02	4.41	.04	1, 196	.15	.04
Self-directed Task*Social Approval Ego	.00	.74	.39	1, 195	.07	.39
Self-directed Task*Performance Climate	.01	2.44	.12	1, 194	.10	.12
Social Approval Ego*Performance Climate	.04	8.81	.01	1, 193	.20	.01
Self-directed Task*Social Approval Ego* Performance Climate	.00	.15	.70	1, 192	-.03	.70

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
External Regulation						
Self-directed Task	.01	2.43	.12	1, 198	-.11	.12
Social Approval Ego	.18	42.60	.000	1, 197	.42	.000
Performance Climate	.02	5.12	.03	1, 196	.15	.03
Self-directed Task*Social Approval Ego	.00	.52	.62	1, 195	-.04	.62
Self-directed Task*Performance Climate	.02	4.10	.04	1, 194	.11	.04
Social Approval Ego*Performance Climate	.01	1.86	.17	1, 193	.09	.17
Self-directed Task*Social Approval Ego* Performance Climate	.00	.01	.93	1, 192	-.01	.93
Amotivation						
Self-directed Task	.08	16.22	.000	1, 198	-.27	.000
Social Approval Ego	.00	.07	.79	1, 197	-.02	.79
Performance Climate	.14	36.19	.000	1, 196	.40	.000
Self-directed Task*Social Approval Ego	.02	5.70	.02	1, 195	-.16	.02
Self-directed Task*Performance Climate	.03	7.86	.01	1, 194	.15	.01
Social Approval Ego*Performance Climate	.00	.13	.72	1, 193	.02	.72
Self-directed Task*Social Approval Ego* Performance Climate	.02	5.46	.02	1, 192	.15	.02
Tension						
Self-directed Task	.00	.50	.48	1, 198	-.05	.48
Social Approval Ego	.02	3.97	.05	1, 197	.14	.05
Performance Climate	.02	4.84	.03	1, 196	.16	.03
Self-directed Task*Social Approval Ego	.00	.84	.36	1, 195	-.07	.36
Self-directed Task*Performance Climate	.00	.20	.66	1, 194	-.03	.66
Social Approval Ego*Performance Climate	.01	2.80	.10	1, 193	.12	.10
Self-directed Task*Social Approval Ego* Performance Climate	.00	.25	.62	1, 192	-.04	.62

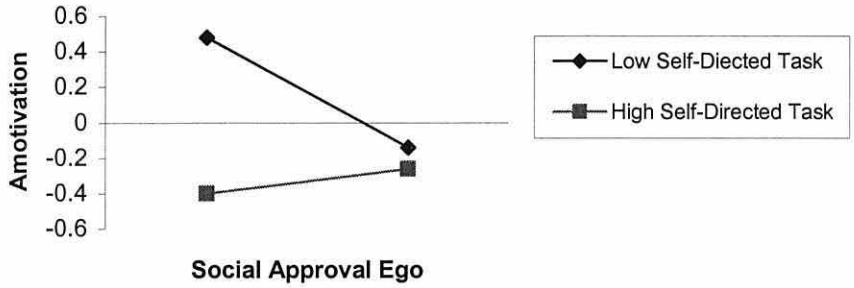

Figure 15. Interaction with Self-Directed Task and Social Approval Ego on Ammotivation

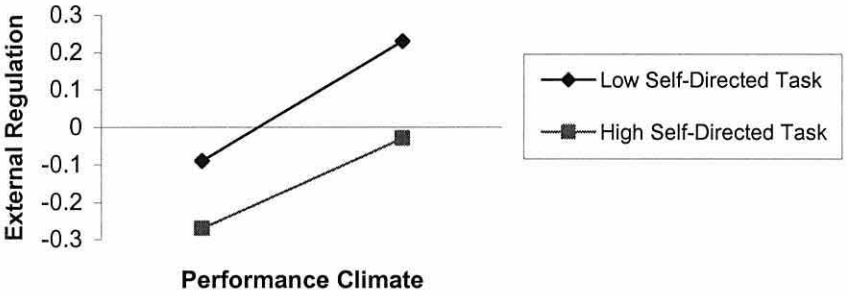

Figure 16. Interaction with Self-Directed Task and Performance Climate on External Regulation

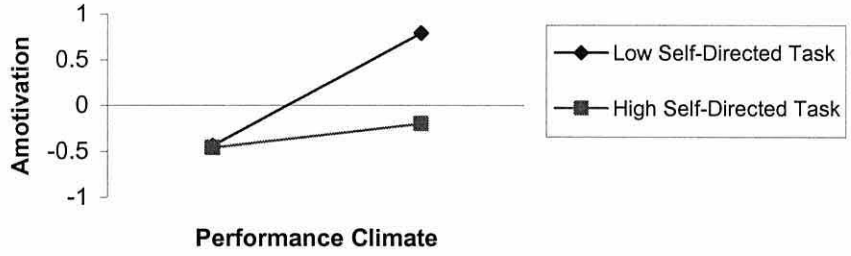

Figure 17. Interaction with Self-Directed Task and Peformance Climate on Ammotivation

Self-directed Task, Social Approval Ego, and Performance Climate had significant 3-way interactions (significant R^2_{change}) on IM Stimulation and Amotivation. The nature of these relationships is illustrated in Figures 18 to 21, from which it can be seen that a strong performance climate appears to be problematic (decreased IM

Stimulation) for athletes with low levels of self-directed task and low levels of social approval ego. However, strong performance climate appears to be beneficial (increased IM Stimulation) for athletes with low levels of self-directed task and high levels of social approval ego and for athletes with high levels of self-directed task, regardless of social approval ego levels. A strong performance climate appears to be problematic (increased Amotivation) for athletes with low levels of self-directed task with either high or low levels of social approval ego (similar to pattern above). A strong performance climate may be beneficial (decreased Amotivation) for athletes with high levels of self-directed task and low levels of social approval ego.

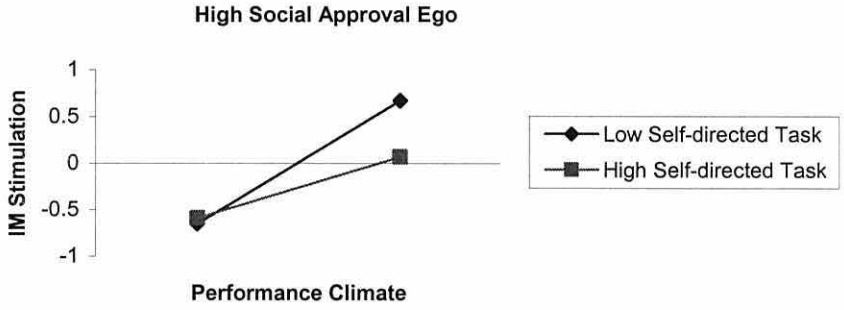

Figure 18. High Social Approval Ego, Self-directed Task and Performance Climate Interaction on IM Stimulation

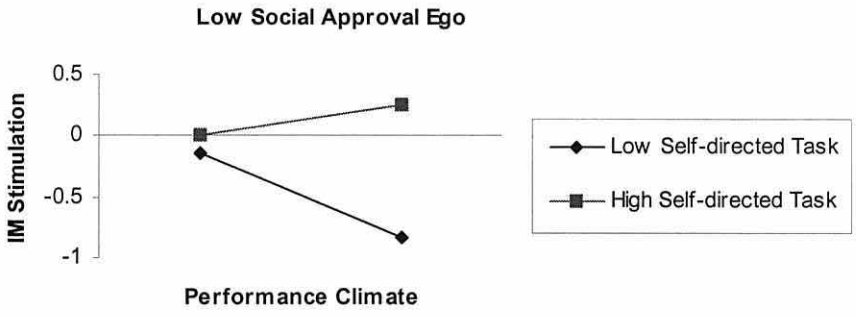

Figure 19. Low Social Approval Ego, Self-directed Task and Performance Climate Interaction on IM Stimulation

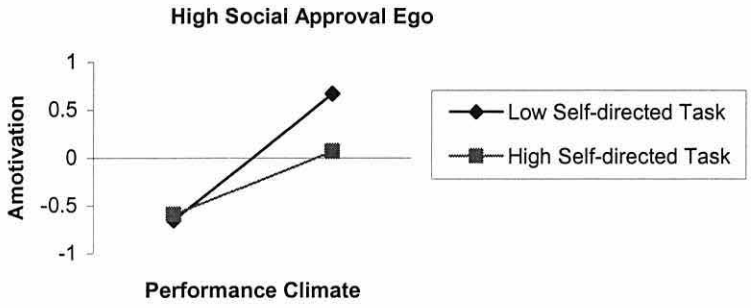

Figure 20. High Social Approval Ego, Self-directed Task and Performance Climate Interaction on Amotivation

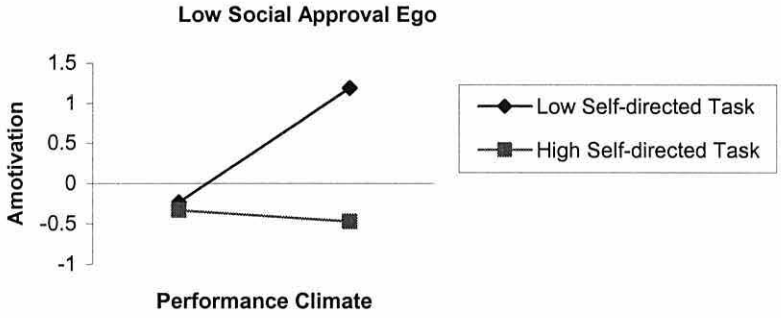

Figure 21. Low Social Approval Ego, Self-directed Task and Performance Climate Interaction on Amotivation

Self-directed Ego, Social Approval Task, and Mastery Climate

Regression results are displayed in Table 6. As before, Self-directed Ego showed significant main effects (significant R^2_{change}) with IM Stimulation, IM Accomplish, Introjected Regulation, and External Regulation. In all cases, the B-coefficients were positive. Social Approval Task showed significant main effects (significant R^2_{change}) on IM Knowledge, IM Stimulation, IM Accomplishment, Identified Regulation, External Regulation, and Amotivation. For all cases, except for Amotivation, the B-coefficients were positive. Mastery Climate showed significant main effects (significant R^2_{change}) on IM Knowledge, IM Stimulation, IM Accomplishment, Identified Regulation, and Amotivation. In all cases except for Amotivation, the B-

Table 6

Moderated Hierarchical Regression Analysis for Self-directed Ego, Social Approval Task and Mastery Climate

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Knowledge						
Self-directed Ego	.02	3.39	.07	1, 199	.13	.07
Social Approval Task	.05	10.41	.001	1, 198	.29	.001
Mastery Climate	.13	30.69	.000	1, 197	.37	.000
Self-directed Ego*Mastery Climate	.03	8.66	.004	1, 196	-.18	.004
Self-directed Ego*Social Approval Task	.00	.52	.47	1, 195	-.03	.47
Social Approval Task*Mastery Climate	.00	.63	.43	1, 194	.06	.43
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.04	.83	1, 193	.01	.83
IM Stimulation						
Self-directed Ego	.02	4.45	.04	1, 199	.15	.04
Social Approval Task	.02	3.97	.05	1, 198	.18	.05
Mastery Climate	.07	16.07	.000	1, 197	.28	.000
Self-directed Ego*Mastery Climate	.00	.18	.67	1, 196	-.03	.67
Self-directed Ego*Social Approval Task	.00	.26	.61	1, 195	-.02	.61
Social Approval Task*Mastery Climate	.000	.02	.90	1, 194	-.01	.90
Self-directed Ego*Social Approval Task* Mastery Climate	.02	4.98	.03	1, 193	.11	.03

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
IM Accomplishment						
Self-directed Ego	.02	4.60	.03	1, 199	.15	.03
Social Approval Task	.05	10.15	.002	1, 198	.28	.002
Mastery Climate	.10	24.87	.000	1, 197	.33	.000
Self-directed Ego*Mastery Climate	.02	5.30	.02	1, 196	-.14	.02
Self-directed Ego*Social Approval Task	.00	.73	.39	1, 195	-.04	.40
Social Approval Task*Mastery Climate	.00	.92	.34	1, 194	.08	.34
Self-directed Ego*Social Approval Task* Mastery Climate	.01	1.33	.25	1, 193	.06	.25
Identified Regulation						
Self-directed Ego	.01	1.02	.31	1, 198	-.07	.31
Social Approval Task	.04	8.89	.003	1, 197	.27	.003
Mastery Climate	.12	29.37	.000	1, 196	.36	.000
Self-directed Ego*Mastery Climate	.01	1.73	.19	1, 195	.08	.19
Self-directed Ego*Social Approval Task	.00	.64	.43	1, 194	-.04	.43
Social Approval Task*Mastery Climate	.01	1.08	.30	1, 193	-.08	.30
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.09	.77	1, 192	-.01	.77
Introjected Regulation						
Self-directed Ego	.07	13.74	.000	1, 199	.25	.000
Social Approval Task	.00	.85	.36	1, 198	-.08	.36
Mastery Climate	.01	1.83	.18	1, 197	-.10	.18
Self-directed Ego*Mastery Climate	.01	2.05	.15	1, 196	-.10	.15
Self-directed Ego*Social Approval Task	.03	7.09	.01	1, 195	.12	.01
Social Approval Task*Mastery Climate	.02	4.52	.04	1, 194	-.18	.04
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.70	.40	1, 193	.04	.40

Cont…

	R^2_{Change}	F_{change}	SigF_{Change}	d.f	β	Sigβ
External Regulation						
Self-directed Ego	.10	22.25	.000	1, 199	.32	.000
Social Approval Task	.02	3.95	.05	1, 198	.17	.05
Mastery Climate	.00	.22	.64	1, 197	-.03	.64
Self-directed Ego*Mastery Climate	.00	.40	.53	1, 196	-.04	.53
Self-directed Ego*Social Approval Task	.01	2.20	.14	1, 195	.07	.14
Social Approval Task*Mastery Climate	.01	1.01	.32	1, 194	-.08	.32
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.28	.60	1, 193	.03	.60
Amotivation						
Self-directed Ego	.00	.00	.95	1, 199	-.00	.95
Social Approval Task	.02	3.95	.05	1, 198	-.18	.05
Mastery Climate	.11	24.14	.000	1, 197	-.34	.000
Self-directed Ego*Mastery Climate	.00	.14	.71	1, 196	.02	.71
Self-directed Ego*Social Approval Task	.01	2.27	.13	1, 195	.07	.13
Social Approval Task*Mastery Climate	.00	.02	.89	1, 194	.01	.90
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.60	.44	1, 193	-.04	.44
Tension						
Self-directed Ego	.01	.94	.33	1, 199	.07	.33
Social Approval Task	.00	.06	.81	1, 198	-.02	.91
Mastery Climate	.01	2.82	.10	1, 197	-.12	.10
Self-directed Ego*Mastery Climate	.01	1.45	.23	1, 196	-.08	.23
Self-directed Ego*Social Approval Task	.00	.47	.50	1, 195	.03	.50
Social Approval Task*Mastery Climate	.00	.03	.87	1, 194	.02	.87
Self-directed Ego*Social Approval Task* Mastery Climate	.00	.38	.54	1, 193	.03	.54

coefficients were positive. Self-directed Ego and Mastery Climate showed significant 2-way interactions (significant R^2 change) on IM Knowledge and IM Accomplishment. Self-directed Ego and Social Approval Task showed a significant 2-way interaction (significant R^2 change) on Introjected Regulation. Social Approval Task and Mastery Climate showed a significant 2-way interaction (significant R^2 change) on Introjected Regulation. See Figures 22 to 24 for illustrations of the 2-way interactions.

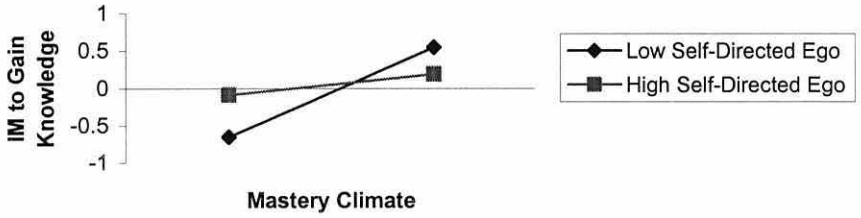

Figure 22. Interaction with Self-Directed Ego and Mastery Climate on IM to Gain Knowledge

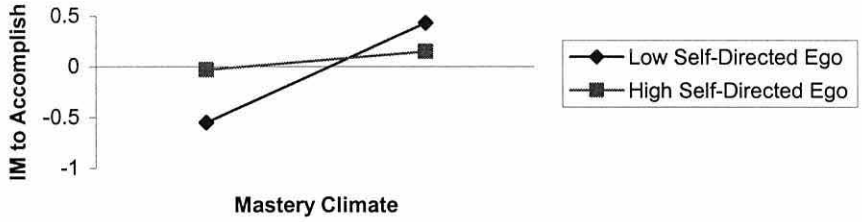

Figure 23. Interaction with Self-Directed Ego and Mastery Climate on IM to Accomplish

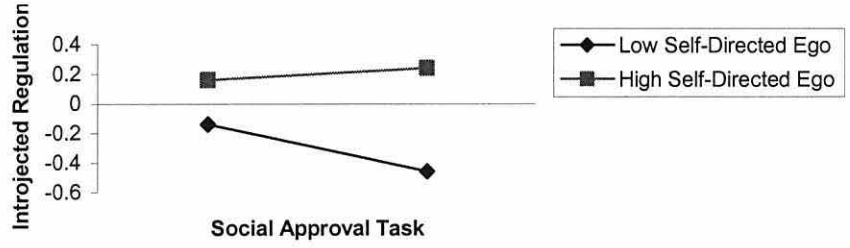

Figure 24. Interaction with Self-Directed Ego and Social Approval Task on Introjected Regulation

Self-directed Ego, Social Approval Task, and Mastery Climate showed a significant 3-way interaction (significant R^2_{change}) with IM Stimulation. The nature of this relationship can be seen in Figures 25 and 26, from which it can be seen that a strong mastery climate appears to be most beneficial (increased IM Stimulation) for athletes with high levels of self-directed ego and high levels of social approval task. The combination that was most detrimental to IM Simulation was when the athlete had low levels of self-directed ego and low levels of social approval task in a weak mastery climate.

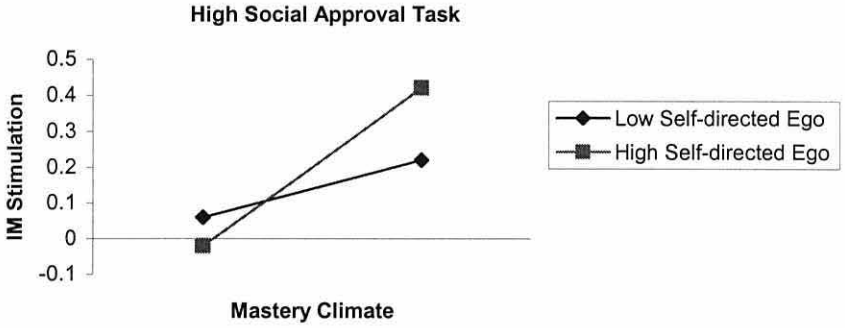

Figure 25. High Social Approval Task, Self-directed Ego and Mastery Climate Interaction on IM Stimulation

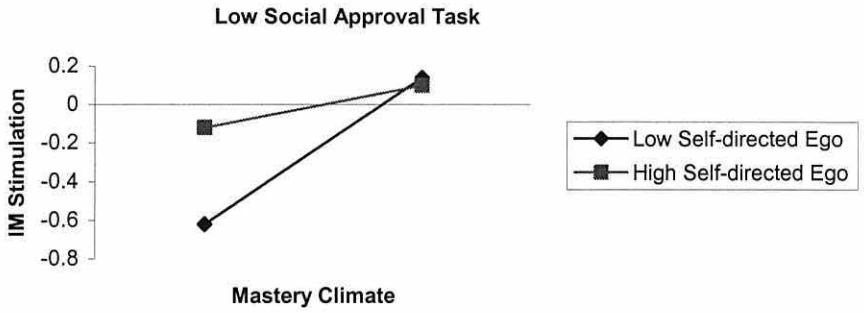

Figure 26. Low Social Approval Task, Self-directed Ego and Mastery Climate Interaction on IM Stimulation

Discussion

The correlation matrix (see Table 2) indicated that conceptually related variables were largely related as expected. For example, self-directed task was related to perceptions of a mastery climate and the three intrinsic motivation variables. Self-directed ego was related to perceptions of a performance climate, introjected regulation, and external regulation. However, self-directed ego was also related to IM to experience stimulation and IM to accomplish. While this correlation is not in line with past research (Duda, 1989; Ewing, 1981), there is no *a priori* reason why an athlete with high levels of self-directed ego (perhaps combined with high levels of perceived competence) should not be motivated to experience stimulation and feelings of accomplishment by outperforming their opponents. In addition, having a focus on outperforming the opposition also predicts variables related to low self-determined motivation (i.e., avoid feelings of guilt, no choice but to strive to outperform opponent in competitive situation). This finding may also suggest that the seven motivation variables measured do not lie on a continuum of self-determination (Chatzisarantis, Hagger, Biddle, Smith & Wang, 2003). The correlations between the motivation variables suggest that, in contrast to the current seven variables (Vallerand, 1992), there may in fact only be three motivation variables. In line with suggestion by Ryan and Deci (2000), these three variables include Intrinsic Motivation (IM to Gain Knowledge, IM to Accomplish, IM to Experience Stimulation, Identified Regulation), less Internalised Motivation (Introjected Regulation, External Regulation), and Amotivation.

The main aim of the present study was to examine the moderating role of social approval in the relationship between achievement goals and motivational climate on motivation/tension. As Roberts (1992), the P x E fit hypothesis (Pervin,

1968), and Deci and Ryan (1991) suggested, a 'match' may lead to increased motivation and reduced anxiety. However, when levels of social approval are considered, the influence of a matched goal orientation and motivational climate appears rather more complex. Only when combined with low social approval ego did a match (high levels of self-directed ego and strong performance climate) predict reduced tension and increased identified regulation.

Several intriguing 2-way interaction results emerged. In a strong performance climate, it appears that having low levels of self-directed task orientation is problematic (increased External Regulation and Amotivation). In a strong mastery climate, it appears that high levels of self-directed ego orientation is problematic (decreased IM Knowledge and IM Accomplish). These 2-way interactions will be discussed further with the 3-way interactions. In a strong mastery climate, it appears that high levels of social approval task orientation are beneficial (reduced Introjected Regulation, External Regulation and Amotivation). In a strong performance climate, it appears that low levels of social approval ego orientation are beneficial (increased Identified Regulation and reduced Tension). In a strong mastery climate, athletes with high levels of social approval task orientation receive cues from their environment (i.e., reward for performance improvement) that reinforce their dispositional goal orientation (i.e., need to gain approval from others for improving performance). This match results in beneficial motivational outcomes (e.g., reduced introjected regulation, external regulation, and amotivation), as predicted by the P x E fit hypothesis (Pervin, 1968) and Deci and Ryan (1991). This is in contrast to the result for an athlete performing in a strong performance climate, where high levels of social approval ego orientation were detrimental (i.e., increased athlete's levels of tension). This emphasises the qualitative differences between mastery and performance

climates. Perhaps the need for the athlete to gain approval from others for outperforming others, and being in a climate which promotes social comparisons with others, resulted in an irresistible focus upon external agents (as reflected by the positive correlations between performance climate and social approval ego with external regulation). This focus on external agents (i.e., external locus of causality) may reduce the athlete's feelings of autonomy and result in low self-determined motivation. This is in line with Organismic Integration Theory and predictions by Deci and Ryan (1985, 1991), and research which has shown low perceptions of autonomy to mediate contextual and social factors (i.e., team cohesion, leadership style) and contextual motivation (Blanchard & Vallerand, 1996; Reeve & Deci, 1996).

When social approval ego levels are high, it appears that low levels of self-directed ego or self-directed task orientation are beneficial (reduced Introjected Regulation and Amotivation respectively). When social approval task orientation levels are high, low levels of self-directed ego orientation are beneficial (reduced Introjected Regulation). Both of these 2-way interaction results suggest that when social approval levels (both task and ego) are high, it is desirable to have low levels of self-directed goal orientations (especially ego). It is possible that the focus on the need to gain approval from others conflicts with the focus upon the self (i.e., to improve performance and/or outperform others), in line with predictions by Deci and Ryan (Organismic Integration Theory, 1985, 1991), although this explanation remains speculative at the present time.

Wilson and Hardy (in preparation: chapter 4) investigated the interaction of mis/matched goal orientations and motivational climate on motivation and tension utilising the POSQ (Roberts *et al.,* 1998). In line with Wilson and Hardy's (in preparation: chapter 4) regression results, no significant 2-way interactions were

found for self-directed task and mastery climate. However, unlike the results of Wilson and Hardy, which found significant 2-way interactions for ego orientation and performance climate on IM Knowledge, IM Accomplishment, IM Stimulation, and Introjected Regulation, current regression results found no significant 2-way interactions for self-directed ego orientation and performance climate. These conflicting results may reflect a difference between the ego subscales of the two measurement tools (POSQ and PGOQ) utilised. For example, the POSQ ego subscale contains a social approval item ('I show other people I am the best') and the PGOQ self-directed ego subscale does not. Perhaps the social approval element of the POSQ ego subscale drove the ego orientation and performance climate interactions found by Wilson and Hardy (in preparation: chapter 4).

With regards to a mismatched goal orientation and motivational climate, in the present study the 2-way interaction results showed that: (a) strong mastery climate was problematic for individuals with high levels of self-directed ego; and (b) a strong performance climate was problematic for athletes with low levels of self-directed task. The findings for self-directed ego and mastery climate reinforced the findings of Wilson and Hardy (in preparation: chapter 4), who also found that a strong mastery climate was less beneficial for athletes with high levels of ego orientation (cf. low levels of ego orientation). Wilson and Hardy (in preparation: chapter 4) found no significant 2-way interactions for task orientation and performance climate. As the self-directed task orientation and performance climate main effects found in the current study are nearly identical (except for task orientation with identified regulation) to those found by Wilson and Hardy (in preparation; chapter 4), the apparent contradiction between these two sets of results is substantially reduced. The conflicting performance climate interaction results of the current study and that of

Wilson and Hardy (in preparation: chapter 4) leads the author to suggest that the differences may be driven by measurement variation (see above).

There were two significant 3-way interaction results for a matched self-directed goal orientation, motivational climate, and social approval goal orientation combination. In summary, the interactions suggested that in a strong performance climate, the combination that appears to be most beneficial (reduced tension levels and increased identified regulation) is when the athlete has high levels of self-directed ego and low levels of social approval ego. The most problematic combination appears to be when the athlete is performing in a strong performance climate and has low levels of self-directed ego and high levels of social approval ego. Perhaps an athlete with a strong need to gain approval from others for outperforming others (high social approval ego), but a weak desire to outperform others (low self-directed ego), in a climate which reinforces social comparisons and competition, has reduced levels of perceived autonomy in achievement situations (e.g., an athlete with high levels of social approval may become reliant on others for providing competence information) and is in conflict with their environment (P x E fit hypothesis; Deci & Ryan, 1985, 1991).

There were no significant 3-way interactions between mastery climate, self-directed task, and social approval task. This is in line with previous research that has failed to find interactions between a mastery climate and task orientation on intrinsic motivation variables (Cresswell *et al.,* 2003; Newton & Duda, 1999; Wilson & Hardy, in preparation: chapter 4).

With regards to a mismatched motivational climate, self-directed, and social approval goal orientation, there were three significant 3-way interactions. In a strong performance climate, it appears that low levels of self-directed task and low

levels of social approval ego are problematic (decreased IM Stimulation and increased Amotivation). In a strong performance climate, the combination that appears to be most beneficial (increased IM Stimulation) is when an athlete has high levels of self-directed task and low levels of social approval ego. It appears that high levels of self-directed task may offset any potentially negative influences a strong performance climate may have on self-determined motivation. This is similar to the 2-way interaction finding. However, in a strong mastery climate, it appears that high levels of self-directed ego and high levels of social approval task is the most beneficial combination (increased IM Stimulation). In a weak mastery climate, the combination that appears to be problematic is when the athlete has low levels of self-directed ego and low levels of social approval task. A strong mastery climate appears to offset any potentially negative influence high levels of self-directed ego may have on an athlete's self-determined motivation. Within this combination, high levels of social approval task are beneficial. The authors acknowledge that it is not clear why, and suggest that this relationship requires further examination. Perhaps as the athlete has a need to gain approval from others for personal improvement, this may not significantly reduce their perceptions of autonomy in achievement situations, as they are still able to focus on their own performance (Deci & Ryan, 1985, 1991).

It seems that an individual performing in a climate that is a 'mismatch' with their dominant self-directed goal orientation will only result in reduced motivation and increased tension (Pervin, 1968; Roberts, 1992) if that individual has high levels of social approval ego in a strong mastery climate or low levels of social approval task in a strong performance climate. An individual with high levels of social approval ego focuses on external factors when they conceptualise achievement (i.e., seek to gain approval from coach for outperforming other performers). This tendency to be reliant

on others for competence information/feedback (i.e., external locus of causality) could lead to reduced perceptions of autonomy in achievement situations (Deci & Ryan, 1985, 1991; Harwood & Swain, 2001), resulting in low self-determined motivation and high levels of tension.

The current study utilised Wilson et al.'s (in preparation: chapter 2) PGOQ to measure self-directed and social approval orientations. This measurement tool allowed the researchers to investigate the impact of social approval upon the achievement goal and motivational climate interaction. This relationship could not have been examined utilising traditional measures of achievement goals (POSQ, Roberts, Treasure, & Balague, 1998; TEOSQ, Duda & Nicholls, 1992). In comparison to the high factor correlations (r = .32 to .93) for the PGOQ found by Wilson *et al.* (in preparation: chapter 2), the factor correlations were improved in the present study (r = .12 to .82).

A limitation of the current study is that perceptions of competence were not accounted for. Nicholls and Miller (1983, 1984) suggested, and Hardy, Jones and Gould (1996) reinforce, that a high ego orientation might only be maladaptive when combined with low levels of perceived competence. It may be that those athletes with high levels of self-directed ego, when training/competing in a strong performance climate, also had high levels of perceived competence. Maybe that is why this interaction predicted motivation variables high in self-determined motivation and low levels of tension.

The present findings suggest that those individuals with the ability to influence the performance environment of athletes (e.g., coaches, managers, parent, team mates, and sport psychologists) should promote low levels of social approval ego within their performers. For example, encouraging athletes to rate their own performance relative

to others, instead of coaches/managers/parents/team mates/sport psychologists giving them this feedback, may promote reduced levels of social approval ego. This may lead athletes' to develop a sense of autonomy over their performance and conception of success, whether that is self-directed task or ego focused. In turn, this may lead the athlete to refer to him or herself for information regarding perceptions of achievement that, with regards to Attribution Theory (Biddle, Hanrahan, & Sellars, 2001; Weinberg & Gould, 2003; Weiner, 1985, 1986), is potentially more adaptive, as these perceptions are internal and controllable.

Future research in this area should focus on investigating the moderating role of social approval on the achievement goal and motivational climate interaction with other variables, such as perceptions of competence. Past research has indicated that perceptions of competence play an important role with regards to achievement goal orientations (Newton & Duda, 1999; Nicholls & Miller, 1983, 1984). It may be interesting to investigate how high levels of self-directed ego, when combined with low perceived competence, interacts with motivational climate and how social approval goal orientation may moderate this relationship. However, this is an extremely complex analysis (i.e., 4-way interaction).

The current study aimed to investigate the moderating role of social approval on the self-directed goal and motivational climate relationship. Results showed equivocal support for the hypotheses. In summary, results suggested that low levels of social approval ego might be more adaptive in moderating the self-directed goal orientation and motivational climate interaction in predicting motivation variables high self-determination and low levels of tension. The use of the PGOQ (Wilson *et al.,* in preparation: chapter 2), or other tools with social approval subscales in them, to measure self-directed and social approval achievement goals provides further support

for investigating the potential of alternative conceptual models and measurement tools to explore athletes conceptions of success in achievement contexts.

CHAPTER 6

DISCUSSION

The aim of the present programme of research was to investigate the impact of interactions between achievement goals and motivational climate on motivation and tension. The theory that underpinned this programme was Nicholls' (1984, 1989) Achievement Goal Theory and Pervin's (1968) Person x Environment Fit hypothesis. This latter theory predicts that when an environment matches (complementary) an individual's personality, this will result in improved motivation, performance, and satisfaction. However, if the environment does not match (conflicting) an individual's personality, this will result in a lack of motivation, decreased performance, and conflict.

Roberts (1992) proposed that an individual with high levels of task orientation performing in a strong mastery climate would be motivated and satisfied. That same individual, if placed in a performance climate, would experience reduced motivation and conflict/tension. Roberts (1992) proposed similar relationships for an individual with high levels of ego orientation in a strong performance and mastery climate. These hypotheses have only been directly tested in one previous study (Newton & Duda, 1999). This programme of research aimed to test the P x E fit hypothesis (Pervin, 1968) and Roberts' (1992) proposition.

In light of the limitations of existing measures of achievement goals, a new measure of achievement goals was developed and the concurrent and predictive validity of the new measure was tested. The interaction of achievement goals and motivational climate was then examined using an existing measure of achievement goals and with the new measure of achievement goals.

Study One (chapter 2) aimed to examine the factor structure of a four-goal model of achievement goal orientations proposed by Harwood (1997) and Harwood and Swain (2001, 2002). In a qualitative study involving junior tennis players, Harwood and Swain (2001) concluded that young athletes conceptualise success in task and ego involving terms for both self-directed and socially driven reasons. Harwood and Swain (2002) developed a 12-item questionnaire (Profile of Goal Involvement Questionnaire; PGIQ) to measure self-directed task, self-directed ego, social approval task, and social approval ego. However, Harwood and Swain (2002) conducted no factor analysis of this measure. In the first part of study one, 720 athletes completed a revised version (18 additional items) of the PGIQ. Sequential model testing procedures (Joreskog, 1993) resulted in a 16-item measure of the four-goal model. Confirmatory factor analysis results showed an adequate fit of the model to the data [χ^2/d.f = 2.99, RMSEA = .05, CFI = .97, SRMR = .03, and NNFI = .96]. However, due to the limited number of items for social approval task and no concurrent validity testing, further factor analysis was conducted.

In the second part of Study One (chapter 2), 674 athletes completed a revised PGIQ, with an additional 51 items added to the 16-items from Study One. Athletes also completed the Perceptions of Success Questionnaire (POSQ; Roberts *et al.,* 1998) for concurrent validity analysis. Sequential model testing procedures (Joreskog, 1993) resulted in a 20-item measure (Profile of Goal Orientation Questionnaire; PGOQ) of the four-goal model. Confirmatory factor analysis results showed a good fit of the data to the four-goal model [χ^2/d.f = 2.90, RMSEA = 0.05, CFI = 0.98, SRMR = .06, NNFI = 0.98]. Because of high factor-factor correlations, alternative models were tested, but the four-goal model had the best fit statistics. It is worth noting that factor-factor correlations obtained in Study Four (chapter 5) were

improved from those found in Study One (chapter 2). Concurrent validity analysis showed that those factors that were expected to correlate did correlate, namely: Self-directed Task and POSQ Task; Self-directed Ego and POSQ Ego; and Social Approval Ego and POSQ Ego. As expected, there were no significant relationships between Self-directed Task and POSQ Ego, Self-directed Ego and POSQ Task, or Social Approval Ego and POSQ Task. However, Social Approval Task did not correlate with POSQ Task, but did correlate with POSQ Ego. This finding was unexpected. This later correlation falls in line with research within education indicating that ego involvement and social approval appear to be highly correlated (Nicholls, Cobb, Wood, Yackel & Patashnick, 1990; Nicholls *et al.*, 1985; Urden, Turner, Park & Midgely, 1992).

As discussed in Study One, one reason why the correlations between PGOQ and POSQ variables that did not entirely support predictions may be due to the fact that items within the PGOQ are not confounded by hypothesised behavioural correlates of achievement goal orientations (as some items in the POSQ are). In addition, the possibility remains that other models including social variables (e.g., Allen, 2003, 2005; Stuntz & Weiss, 2003) have stronger predictive validity than either of the two dimensional models (TEOSQ/POSQ) or the four-factor PGOQ model. However, despite high factor-factor correlations, main effects found by Hardy and Wilson (in preparation; chapter 5) suggested that the PGOQ does have good predictive validity (self-directed task significant predictor of IM; self-directed ego significant predictor of introjected and external regulation). It was suggested that future research should focus on: 1) clarifying the strong correlations that appear to exist between ego and social approval goal orientations; 2) examining situations in which social orientations might play a key role; and 3) purify the current measures of

task and ego orientation so that one can at least have confidence in the (possibly limited range of) goal orientations that they measure. However, the very good fit of the data to the four-goal model did give the author confidence in utilising the PGOQ in further studies within this programme of research.

Hardy (1997, 1998) argued that previous researchers (Duda, 1997; Nicholls, 1989) have confounded the definitions of goal orientations with possible correlates of goal orientations. Hardy (1998) suggested that the task orientation sub-scale of the Task and Ego Goal Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992) confounds the definition of a task orientation (perceptions of competence are self-referenced) with hypothesised correlates of a task orientation (e.g., effort and enjoyment). The four-factor measure of achievement goal orientations (chapter 2) was developed in an attempt to (a) resolve the issue of confounding the definitions of goal orientations with hypothesised behavioural correlates, (b) develop a more competition relevant measure of achievement goals, and (c) include social approval goal orientations. The very good fit statistics of the four-factor model confirm a four-factor structure. In addition, the four-factor model was tested against alternative models (including a model that reflected the traditional two-factor model), and proved to be the best fitting. No items within the new four-factor model measure hypothesised behavioural correlates and questions are relevant to competition (e.g., 'I have fewer weaknesses than other competitors').

Elliot (1999) suggested a four-goal model of achievement goal orientations, involving the dichotomisation of the two existing achievement goals (task and ego). Elliot and Church (1997) proposed that individuals have 'need for achievement '(approach) and' fear of failure' (avoidance) achievement motives. These two achievement motives and an individual's perception of competence predict what goal

orientation an individual will adopt in achievement contexts (Elliot & Church, 1997). Elliot (1999) suggested that, due to mixed empirical findings regarding ego goal orientations, there is a need to differentiate ego goal orientation into approach and avoidance factors. Elliot and Church (1997) also suggest that a task goal orientation could also be separated into approach and avoidance factors, with task avoidance being defined as avoiding self-referent incompetence.

There are two reasons why Elliot and Church's (1997) conceptualisation of achievement goals was not adopted in the development of the PGOQ four-factor model of achievement goal orientations. Firstly, Elliot and Church's achievement motives are "underpinned by the differentiation of ability" (i.e., stable versus changeable) (Elliot, 1999, p. 175), which is a bipolar construct. As the traditional two goal orientations have been shown to be orthogonal, these achievement motives (approach and avoidance) cannot be equated with achievement goals. This is similar to the critique presented in the introduction (chapter one) relating to the differentiation of ability and effort underpinning task and ego goal orientations and conceptualised by Nicholls (1984). A second reason is related to the way Elliot and Church conceptualise approach and avoidance motives, along with perceptions of competence, as predictors of achievement goals. According to Elliot and Church, achievement goals are proximal predictors of achievement relevant processes and outcomes. This conceptualisation suggests that achievement goals are situation specific (i.e., state goal involvement) and achievement motives are the dispositional (i.e., trait goal orientations). This is in contrast to the conceptualisation proposed by Nicholls (1984, 1989), which suggests that goal orientations can operate as dispositional and situation specific constructs. For example, an athlete can have high levels of self-directed task goal orientation (dispositional), but prior to competition,

levels of self-directed ego involvement (state) are high. The way Elliot and Church (1997) conceptualise approach and avoidance was not as achievement goals, but as motivational tendencies. Therefore, Elliot and Church's model was not utilised as this programme of research was focused on developing a model and measure of achievement goal orientations, not motivation.

The equivocal CFA results of the four-factor model found in study one (chapter two) does leave the door open with regards to investigating alternative conceptualisations and measures of achievement goal orientations. However, when examining the measurement tool derived from Elliot and Church's (1997) three-factor model of achievement goals [ego (performance) approach, ego (performance) avoidance, mastery), many items confound the conceptualisation of the achievement goals with hypothesised behavioural correlates (e.g., worry, fear, learning, deeper knowledge). In addition, an item within the ego approach subscale includes social approval ('show my ability to my family, friends, advisors or others'). Conroy, Elliot and Hofer (2003) examined a four-factor model and measure, which was underpinned by Elliot's (1999) conceptualisation [task (mastery) approach, task avoidance, ego (performance) approach, ego avoidance]. Again, items confound the conceptualisation of the achievement goals with hypothesised behavioural correlates (i.e., worry, fear, concern). The CFA result of the four-factor model, with all variables being allowed to correlate, was poor ($x^2 = 161.7, p = .08$; d.f = 48; CFI = .94; NNFI = .92) by current standards (Hu & Bentler, 1999). So while the results of factor structure analyses of the PGOQ are equivocal, at the very least, the author has confidence in the items being an accurate reflection of the goal orientation concepts under investigation and had a better fit compared to the Conroy *et al.* (2003) four-factor model.Despite the differences in the conceptualisation of achievement goal

orientations between Elliot and Church and that presented in study one (chapter two), there are some congruencies worthy of discussion. The dichotomising of task and ego goals by Elliot and Church (approach and avoidance) does lend conceptual support for the dichotomising of task and ego goals (self-directed and social approval) in this programme of research. In a discussion of Elliot and Church's (1997) four-factor model of achievement goals, Elliot (1999) suggestion that the two achievement goals could be viewed as 'self-presentation' and 'presentation to others' contructs. This suggestion reflects the current conceptualisation of the four achievement goals presented in study one (chapter two) and provides further support for the conceptualisation of self-directed and social approval task and ego goal orientations. Despite Elliot and Church's model being ignored in the factor development process, an item in the final version of the PGOQ ('I make fewer mistakes than other competitors') does reflect their conceptualisation of ego avoidance goal orientation. The inclusion of this item does warrant the consideration of the role of approach and avoidance goals in future research utilising the PGOQ and other achievement goal models/measures.

In order to test the predictive validity of the PGOQ, the relationship with process goals were examined in Study Two (chapter 3). Utilising 150 rugby union players, the 16-item PGOQ (from part one of Study One) was used to measure self-directed task, self-directed ego, social approval task, and social approval ego goal orientations. A revised version of Harwood's (1997) tennis specific process goal questionnaire was utilised to measure rugby player's process goals. Regression analyses revealed that, in line with the hypotheses, self-directed task predicted five of the seven process goal variables. Social approval task predicted one of the seven process goal variables. Social approval ego negatively predicted two out of the seven

process goal variables. Self-directed ego had no significant additive effects when predicting process goal variables after the other goal orientation variables had been accounted for. These findings were in line with the hypothesised relationships and add support to the predictive validity of the PGOQ. The significant and positive correlations obtained between self-directed ego and process goal variables are in line with suggestions by Hardy (1997, 1998) that having high levels of ego orientation does not predispose an athlete *against* maintaining a process focus if it serves to satisfy their conception of success. However, the regression results do support Duda *et al.*'s (1991) and Zimmerman and Kitsantas (1996) assertion that task involvement is associated with a process focus. It was concluded that high levels of self-directed task orientation predict a strong process focus, while high levels of self-directed ego orientation do not appear to be detrimental to maintaining a process focus.

With regards to the predictive validity of the four-factor model, the relationship of the four goal orientations was examined with process goals. Hardy (1998) proposed that there is no logical reason why an individual with high levels of task orientation, as defined by Nicholls (1989), should have any stronger focus upon the process (effort, enjoyment) of performing, than an individual with high levels of ego orientation. The results of Study Two (chapter 3) fall in line with Hardy's (1998) proposition, as both self-directed task and ego orientation were positively correlated with a process focus. However, self-directed task was a sole significant predictor of five of the seven process goal variables when stepwise regression analyses were conducted. Zimmerman and Kitsantas (1996) suggested that an ego-involving atmosphere was incompatible with a process focus. The results of Study Two (chapter 3) go against Zimmerman and Kitsantas's (1996) suggestions, as self-

directed ego did not negatively predict a process focus. Social approval ego was the only negative predictor of a process focus.

The aim of Study Three (chapter 4) was to examine the influence of interactions between achievement goal orientations and motivational climate upon motivation and tension utilising an existing measure of achievement goal orientations (POSQ; Roberts *et al.,* 1992). POSQ was utilised so that the results could be compared when the new measure of achievement goal orientations (PGOQ) was utilised in Study Four (chapter 5). Pervin's (1968) P x E fit hypothesis and Roberts' (1992) proposition regarding matched and mismatched goal orientations and motivational climate underpinned this study. The study aimed to clarify the findings of Newton and Duda (1999) and Creswell *et al.*'s (2003) studies, which both examined the interactions between achievement goals and motivational climate.

Two hundred and one athletes participated in the Study Three (chapter 4). Moderated hierarchical regression results indicated significant interactions for Ego Orientation and Performance Climate on Intrinsic Motivation (IM) to Gain Knowledge, IM to Experience Stimulation, IM to Accomplish, and Introjected Regulation. Significant interactions also emerged for Ego Orientation and Mastery Climate on IM to Gain Knowledge, IM to Accomplish, and Introjected Regulation. The interactions suggested that a performance climate exerted a positive effect on the intrinsic motivation of high ego oriented athletes, but a negative effect on the intrinsic motivation of low ego oriented athletes. A mastery climate exerted a more positive effect on the intrinsic motivation of low ego oriented athletes compared to high ego oriented athletes and the intrinsic motivation of high ego oriented athletes was generally higher than the intrinsic motivation of low ego oriented athletes. These findings are in stark contrast to the findings of Newton and Duda (1999) and Creswell

et al. (2003). Perhaps these equivocal findings were driven by differences in the samples utilised. Both Newton and Duda (1999) and Creswell *et al.* (2003) utilised junior club/school level athletes. The majority (63%) of the sample utilised in Study Three and Four (chapters 4 and 5 respectively) were regional level or above. It is reasonable to suggest that elite athletes will have (a) higher levels of perceived competence (cf. non-elite athletes), which may offset any potentially negative influences of high levels of ego orientation, and (b) may have high levels of both task and ego orientation, which again may negate any potentially negative influences of high levels of ego orientation.

The rationale for examining interactions between achievement goals and motivational climate is underpinned by the person-environment (P x E) fit hypothesis (Pervin, 1968) and Roberts' (1992) specific proposition regarding a matched and mismatched motivational climate and achievement goal orientation. Results of Study Three (chapter 4) largely support Pervin's (1968) hypothesis and Roberts (1992) suggestions. A performance climate exerted a positive effect on the intrinsic motivation of high ego oriented (as measured by POSQ; Roberts *et al.,* 1998) athletes, but a negative effect on the self-determined motivation of low ego oriented athlete. Also, a mastery climate exerted a more positive effect on the self-determined motivation of low ego oriented athletes compared to high ego oriented athletes.

The aim of Study Four (chapter 5) was to examine the interaction of achievement goal orientations and motivational climate utilising the new four-goal model of achievement goal orientations (PGOQ). Two hundred and one athletes with a mean age of 21.59 years participated in the study. Moderated hierarchical regression results indicated that in strong performance climate, high levels of self-directed ego and low levels of social approval ego appear beneficial; and high levels

of self-directed task appear to protect against the potentially negative influence of high levels of social approval ego in a strong performance climate. In a strong mastery climate, high levels of self-directed ego and social approval task appear to be beneficial.

As Roberts (1992) suggested and the P x E fit hypothesis (Pervin, 1968) predicted, a 'match' will result in increased motivation and reduced anxiety. However, when levels of social approval are considered, the influence of a matched goal orientation and motivational climate appears to be rather more complex. Only when combined with low social approval ego did a match (self-directed ego and performance climate) predict reduced levels of tension. A motivational climate that is mismatched with the dominant self-directed goal orientation should be combined with high levels of social approval task (mastery climate) or low levels of social approval ego (performance climate). It seems that an individual performing in a climate that is a 'mismatch' with their dominant self-directed goal orientation may only result in reduced motivation and increased conflict (Pervin, 1968; Roberts, 1992) if that individual has high levels of social approval ego or low levels of social approval task. Perhaps having a need to gain approval from significant others for outperforming the opposition (high social approval ego) leads the athlete to overly attend to external information. If the information the athlete attends to is in conflict with their dispositional goal orientation, this may result in increased tension and reduced motivation. Alternatively, having little need to gain approval from significant others for improving performance (low social approval task) may lead the athlete to be open to the influence of a detrimental climate (i.e., performance).

The results of Study Four (chapter 5) also support Pervin's (1968) hypothesis and Roberts (1992) suggestion, as a strong performance climate appears beneficial for

athletes with high levels of self-directed ego and low levels of social approval ego. However, against Pervin and Roberts, results showed that in a strong mastery climate, high levels of self-directed ego and social approval task appear to be beneficial. High levels of social approval task appear to offset any potentially negative consequences of having high levels of self-directed ego in a strong mastery climate. From Study Four (chapter 5) we can conclude that the need for social approval does moderate the achievement goal orientation and motivational climate relationship. Urdan and Maehr (1995) called for researchers to reconsider a variety of social goals in the achievement domain (e.g., social solidarity, social approval). The findings of Study Four (chapter 5) confirm the importance of the request from Urdan and Maehr (1995), as social approval goals do appear to moderate the achievement goal and motivational climate relationship. Despite the high factor-factor correlations between the four goal orientation variables, the factors do have different effects upon motivation and tension variables, which adds further weight to the four goal orientations predictive validity.

Hardy (1997, 1998) questioned the role of the differentiation of effort and ability in underpinning achievement goal orientations. According to Hardy (1997, 1998), Harwood *et al.* (2000), and Harwood and Hardy (2001), as goal orientations are orthogonal; the association between the conceptualisation of task and ego involvement (orthogonal) and the differentiation of ability and effort (bipolar) cannot be equivalent. This association raises concerns over the original conceptualisation of task and ego goals (Nicholls, 1984, 1989), as they frequently seem to be equated with the concept of differentiation (Duda & Whitehead, 1998; Ntoumanis & Biddle, 1999; Ommunsden, Roberts & Kavussanu, 1998), which negates one of the primary features of achievement goal orientations (i.e., orthogonality). The results of Study One (chapter 2) do not clarify this issue, as the factor-factor correlations between the four

goal orientation variables were quite high (e.g., self-directed task and self-directed ego r = .39 and .49 in Study One and Study Two of chapter 2 respectively). These high correlations indicate that these goal orientations are not orthogonal. However, in Study Four (chapter 5), factor-factor correlations improved, with self-directed task and social approval ego demonstrating a non-significant correlation (r = .12). It is difficult to foresee four of the six factor pairs ever having low correlations, as they share elements (i.e., ego, task, or social approval). One might expect self-directed task - social approval ego and self-directed ego - social approval task to be orthogonal, while the other pairings may have a more complex relationship.

With regards to the findings of the current program of research and Self-Determination Theory (Deci & Ryan, 1985, 1991), the correlations between the seven motivation variables in studies three and four (chapters four and five respectively) provide evidence which indicates the variables do not lie on a continuum of self-determination (Vallerand, 1992) and do not follow a simplex-order pattern (Deci & Ryan, 1985). High correlations were found between the three intrinsic motivation variables and Identified Regulation, suggesting that these four variables should be joined to form one factor (i.e., internalised motivation). Introjected Regulation and External Regulation had a high correlation, indicating that these two variables should be merged (i.e., less internalised motivation). Amotivation was negatively correlated with the three intrinsic motivation variables, and only had moderate correlations with the less internalised motivation variables, indicating that Amotivation should be a separate motivation factor. This is in line with suggestions made by Ryan and Deci (2000) and the findings of a meta-analysis conducted by Chatzisarantis et al., (2003).

Implications For Practice

The results of Study Two (chapter 3) confirmed that performers who have high levels of self-directed task do focus on the processes of performing. The positive

correlations between self-directed ego and five process goal variables leads the author to suggest that careful consideration is required before discouraging self-directed ego orientations in athletes, as it remains unproven that high levels of ego orientation *per se* are detrimental to performance (i.e., no negative prediction of process goal variables). The correlation results suggested that high self-directed ego oriented individuals maintained or enhanced a process focus, possibly because they perceive that this focus will enable them to satisfy their achievement orientation. However, self-directed task orientation had the strongest (predictive) relationship with process goal variables. Those who influence the achievement context should promote high levels of self-directed task orientation when the use of process goals may facilitate performance. For example, prior to competition a process goal focus may be deemed facilitative, as opposed to a focus upon outcome goals, for successful performance (Kingston & Hardy, 1997). Therefore, coaches/managers should encourage their athletes to become more self-directed task involved (e.g., focus on the need to make progress in the execution of their skills) prior to competition in order to facilitate a process focus (Kingston & Hardy, 1994, 1997).

Social approval task (seven) and social approval ego (two) orientations had significant and positive correlations with process goal variables. However, these positive relationships are lost when the other goal orientations are controlled for in the regression analyses (except for Social Approval Task predicting Tactical Importance). This confirms previous research that has shown that social approval and/or significant others play a role in the competitive environment (Allen, 2003, 2005; Ewing, 1981; Hayashi, 1996; Jarvinen & Nicholls, 1996; Lewthwaite, 1990; Lewthwaite & Piparo, 1993; Schilling & Hayashi, 2001; Stuntz & Weiss, 2003; Whitehead, 1995). The regression results also suggest that athlete's who have high levels of social approval

task orientation are still able to maintain a process focus. Coaches and managers who structure the training and competitive environment should not ignore the potential influence they may have on players. What coaches/managers might attempt to do is assess each individual's achievement orientations (they may have more than one and their orientations could change in different contexts) and encourage players to focus on the processes of playing in such a way that each individual's achievement orientation is satisfied. For example, if an individual has high levels of social approval task orientation, coaches could encourage that player to focus on showing them and their team mates that they can improve their skills (e.g., passing). They could emphasise to players that they will be watching their performance closely to see if they have made progress in their skills. To an individual with low levels of social approval task orientation, this comment might be detrimental to performance, as they would feel pressure from others, which is not an important component of their achievement orientation.

With regards to Study Three (chapter 4), one of the key findings was that a high ego orientation combined with a strong performance climate predicted high levels of IM knowledge, IM stimulation, and IM accomplishment. This result suggests that those involved in influencing the achievement context in which athletes perform (e.g., coaches, managers, parent, team mates, and sport psychologists) should aim to match the climate (i.e., performance) to the athlete's dominant ego orientation (Pervin, 1968; Roberts, 1992), if they wish to increase self-determined motivation. Another key finding was that a mastery climate exerted a more positive effect on the intrinsic motivation of low ego oriented athletes compared to high ego oriented athletes. This result suggests that the coach/manager should promote a strong mastery

climate (i.e., rewards improved performance), if their athletes have low levels of ego orientation.

With regards to Study Four (chapter 5), as indicated by the 2-way interaction results, if athletes have high levels of social approval task (i.e., coach praise for performance improvements) and low levels of self-directed ego (i.e., discourage normative comparisons), a coach/manager should promote a strong mastery climate. If athletes have low levels of social approval ego (i.e., coach does not praise outperforming the opposition) and high levels of self-directed task (i.e., encourage a focus on personal improvement), the coach/manager should promote a strong performance climate.

If athletes have high levels of self-directed ego (i.e., encourage normative comparisons) and low levels of social approval ego (i.e., discourage a need to gain approval for outperforming the opposition) those involved in the performance environment should promote a strong performance climate. If athletes have high levels of self-directed task (i.e., reinforce a focus on performance improvements) and, again, low levels of social approval ego, coaches/managers should develop a strong performance climate. If athletes have high levels of self-directed ego (i.e., promote normative comparisons) and high levels of social approval task (i.e., coach praise for performance improvements), the coach/manager should promote a strong mastery climate.

A consistent result from Study Four (chapter 5) indicates that those individuals with the ability to influence the performance environment of athletes (e.g., coaches, managers, parent, team mates, and sport psychologists) should promote low levels of social approval ego within their performers. For example, by encouraging athletes to rate their own performance relative to others, instead of coaches/managers/parents/

team mates/sport psychologists giving them this feedback, may promote reduced levels of social approval ego. This may lead an athlete to develop a sense of autonomy over their performance and conception of success, whether that is self-directed task or ego focused. In turn, this may lead the athlete to refer to him or herself for information regarding perceptions of achievement that, with regards to Attribution Theory (Biddle, Hanrahan, & Sellars, 2001; Weinberg & Gould, 2003; Weiner, 1985, 1986), is more adaptive, as these perceptions are internal and controllable.

Limitations

The following section will highlight ten limitations of the programme of research, some of which have been mentioned within each chapter. Firstly, the item pool developed in part one of study one (chapter two) was limited due to the number of items within certain subscales (i.e., social approval task had four items). This prevented the author from removing weak or mis-specified items. Second, athletes completing the PGOQ (version I or II) may misinterpret who 'others' are when answering items relating to self-directed ego or social approval (task or ego). For example, athletes may misinterpret which others are in the item social approval ego item 'I show others how I can outperform others'. Athletes may interpret others as opponents, coaches, teammates, parents or significant others. A third limitation was the significant chi-square for the four factor models analysed in parts one and two of study one (chapter two). Despite other fit indices indicating a good fit of the data to the model, and chi-square being influenced by large sample sizes (Biddle *et al.,* 2001; Joreskog & Sorbom, 1993), this does limit the authors confidence in accepting the model and measurement tool in its current form. However, alternative models and the POSQ also had significant chi-square, which gave the author more confidence in

using the PGOQ over existing models and measures in the current programme of research. A fourth limitation was the high factor-factor correlations found in all studies that utilised the PGOQ. The problem appeared to be reduces in Study Four for one of the factor pairs (social approval ego and self-directed task; r = .12). However, the correlation between social approval task and self-directed ego (r = .82) and social approval ego and social approval task (r = .65) were still high. The predictive ability of the PGOQ factors (i.e., self-directed task in study two; self-directed ego, social approval ego and social approval task in study four) indicated that the PGOQ factors do predict independent variance in process goal variables, motivation, and tension, and leads the author to believe that further confirmation of the four-factor structure is warranted. A fifth limitation was the high correlation between social approval task and POSQ ego obtained in study one (chapter two), which raises concerns over the concurrent validity of the social approval task subscale of the PGQO. However, the POSQ ego subscale contains a social approval item ('I show others I am the best').

A sixth limitation relates to the equivocal regression results obtained in study two (chapter three) between the four achievement goals and process goal variables. While self-directed task and self-directed ego had positive correlations with process goal variables, the relationship between self-directed ego and process goal variables were lost in the regression analyses when the other goal orientations had been controlled for. In addition, social approval ego had positive correlations with two process goal variables, but was a negative predictor of process goal variables within the regression analyses after the variance predicted by self-directed task had been controlled for. These equivocal results suggest that self-directed task is a clear predictor of a process focus, but the predictive power of the three remaining goal orientations is questionable. A seventh limitation relating to study two (chapter three)

is the measure of process goals. Assessing an athlete's perception of how important a process of performance is and how long they spend assessing that process of performance after the game does not enable us to conclude that the athlete actually set and achieved process goals. This may explain the high correlation with social approval task. An alternative measure of process goals will be discussed in the future research section below.

The eighth limitation relating to Study Three (chapter 4) and Four (chapter 5) was that perceptions of competence were not measured. Past research has indicated that high levels of ego orientation may only be maladaptive when combined with low levels of perceived competence (Butler, 1992; Elliot & Church, 1997; Elliot & Dweck, 1988; Nicholls & Miller, 1985), and so the present results could be confounded by the failure to measure this variable. The results of Study Three (chapter 4) highlight the importance of examining the interaction effects of achievement goal orientations and motivational climate. When goal orientations have been investigated in isolation, previous findings (Duda *et al.*, 1995; Papaioannou & Kouli, 1999; Theebom *et al.,* 1995) have indicated that a high ego orientation may be problematic (when combined with low levels of perceived competence). However, when considered as an interaction with a strong performance climate, ego orientation predicted motivational variables high in self-determination. The implication of adding perceptions of competence as an independent variable would significantly complicate the analyses and interpretation (i.e., 4-way interactions).

The ninth limitation relates to the measurement tool utilised in studies three and four (chapters four and five) to assess tension which has only been validated for use with adolescents. The sample utilised in studies three and four were 16 to 34 years ($M = 21.59$; SD = 3.05). The POMS-A (Terry *et al.*, 1993) was chosen due to

its length, in order to avoid participant fatigue when completing a large number of questionnaires. The scale did reach acceptable levels of internal consistency ($\alpha = .78$) with the samples in this programme of research.

The final limitation of this programme of study is the homogeneity in the methodology and analysis procedures utilised in three out of the four studies. Studies Two, Three, and Four all employ questionnaires and involve correlation and regression analysis to examine the relationships between the dependent and independent variables. While the analysis and interpretation of the relationships were complex in Studies Three and Four, there is limited variety in the methodology and analysis procedures employed. However, the methodology and type of analysis employed were deemed to be the most appropriate to answer each given research question. Perhaps the stated limitation only impacts upon the author's ability to independently conduct research utilising a variety of methods (i.e., intervention-based research, qualitative research) and analysis procedures (i.e., repeated measures analysis of variance, content analysis) in the future. Hopefully, the generic research skills accumulated whilst conducting this programme of research will enable the author to select and employ the most appropriate methodology and analysis to answer any given research question.

Future Research

Future research should attempt to utilise the PGOQ with a range of samples (i.e., age, level, various sample sizes) in order to confirm the factor structure and test the concurrent and predictive validity of the four-goal model with other measures of goal orientations and motivation/performance related variables. Perhaps reducing the sample size when conducting a CFA on the four-factor model may limit the impact of sample size upon chi-square. Initial confirmatory factor analysis indicated that the four goal orientations had high factor-factor correlations. This problem appeared to

be reduced in Study Four for one of the factor pairs (social approval ego and self-directed task; $r = .12$). However, the correlation between self-directed ego and social approval task ($r = .64$), social approval ego and self-directed ego ($r = .82$), and social approval ego and social approval task ($r = .65$) was still high. Further confirmation of the factors structure is needed to clarify the relationship between the four factors (i.e., correlated or orthogonal).

Within the PGOQ, the term 'others' requires clarification, as athletes may misinterpret who the term 'others' refers to (i.e., opponents, coaches, team-mates, parents). Within each item, if 'others' refer to opponents, the word opponent/opposition should be used. If the term 'others' refers to significant others in the performance environment, then this should be made explicit within the item (i.e., 'I show others (e.g., coach, parent, team mates) how I can outperform the opposition').

Future research should attempt to utilise a more direct measure of process goals when examining the relationship with achievement goal orientations. One possible methodology could be the dynamical systems approach employed by Gerigon *et al.* (2002). This would involve athletes watching a recording of themselves performing, and identifying process goals set/achieved at regular intervals throughout their performance. The split-middle technique would then be utilised to determine trend lines (Callow, Hardy & Hall, 2001; White, 1974). The relationship with process goals and state goal orientations could also be examined.

Further research needs to be conducted to examine the relationship between motivational climate, self-directed goal orientations and other social goals (i.e., social recognition, social acceptance, social status), in light of the interactions found in study

4 (chapter 5) between social approval goals, self-directed goals, and motivational climate.

Future research should attempt to clarify the findings of Study Three (chapter 4) and Study Four (chapter 5). Study Three found significant 2-way interactions between performance climate and ego orientation on the three intrinsic motivation variables and introjected regulation. Study Four found no 2-way interactions between performance climate and self-directed ego. As the only difference between these two studies was the measure of goal orientations employed, these conflicting findings need further clarification by examining the same relationships with different samples. Therefore, the PGOQ (Wilson *et al.,* in preparation: chapter 2) should be utilised to investigate the interaction between achievement goals (self-directed and social approval) and motivational climate with a variety of samples.

In addition, interaction research involving goal orientations should consider the role of perceived competence. Past research has indicated that a high ego orientation may only be problematic when combined with low levels of perceived competence (Nicholls & Miller, 1983, 1984), and so the results of studies three and four could be confounded by the failure to measure this variable. To avoid complex analyses (i.e., 4-way interactions), the role of perceived competence may be best explored in relation to the four goal orientation variables (as measured by the PGOQ) on motivation (i.e., 2-way interaction).

Future research should also attempt to examine the impact of goal orientations (self-directed and social approval) on other motivation, performance, and affect related variables (e.g., anxiety, concentration, state goal orientations). Examining the relationship between athletes with a strong need for social approval and performance related variables would provide practitioners with valuable information regarding

methods to optimise performance when working with this type of athlete. If an athlete had a strong desire to gain approval from significant others, especially social approval ego, this may prevent an athlete from maintaining a focus upon the appropriate information required for successful performance.

An alternative design for examining these relationships could be an intervention study. Athletes could be assigned into groups according to their levels of social approval and exposed to mastery or performance motivational climates to assess the impact of the climate on motivation, performance, and affect related variables (e.g., anxiety, concentration, state goal orientations) for athletes with differing levels of social approval need.

Future research investigating the relationship between goal orientations, motivational climate, and/or social approval (or any other relevant variables) with motivation should consider examining the correlations between the motivation variables to ensure the data follows the simplex-order pattern (i.e., seven motivation variables on a continuum from self-determined to non-self-determined motivation). The current findings suggested that the motivation variables examined did not follow the simplex pattern. Instead, future research may consider examining three motivation variables: internalised motivation (IM to Gain Knowledge, IM to Experience Stimulation, IM to Accomplish, Identified Regualtion), less internalised motivation (Introjected Regulation, External Regualtion), and Amotivation.

Some Personal Concluding Remarks

At the beginning of this programme of research, my focus primarily was on the outcome goal (i.e., producing a thesis that would enable me to get a PhD). However, the processes learnt and engaged in along the way (i.e., critical reading, challenging existing research, data analysis, scientific writing) have become more salient than the resulting outcome. This is not to say that failing to obtain the

doctorate would be acceptable. But, rather, the skills, methods, and applications of knowledge gained through this process will always be with me, regardless of receipt of a doctoral certificate.

If the aim of a PhD programme is to enable an individual to be capable of conducting and communicating research independently, then I believe that the programme has achieved its aim. However, the programme itself is not the sole reason for success, it is due to those individuals (the author included) who contributed to the process. Having a supervisor who is also a critical friend has stimulated the development of several key skills.

The first is to always question. Question what you think you know and believe. Question what others think and believe. Question whether your way is the only way, the best way. Questioning yourself, others, and the way in which you conduct your research results in clarity of understanding and a higher level of confidence in your research process (and outcome). It is not always easy to question yourself, as often you do not have the level of knowledge required to answer those questions. Perhaps finding those answers is the very essence of independent research. As a PhD student, it is not always easy to question others, as the perceived hierarchy that exists in higher education often does not allow it. However, this programme of research has taught me that if you start by questioning yourself and your methods of practice, this enables you to question others with a degree of self-assurance and, perhaps more importantly, openness to the potential answers you may receive.

The second key skill is attention to detail. The reality of the research process is *not just* finding the answer to a question or dis/proving a hypothesis, research is also about communicating your findings to interested others (e.g., coaches, sport psychology consultants, teachers). Those interested others may be prevented from

benefiting from your research findings if you do not pay attention to detail. The peer-review process is crucial for quality and standards to be maintained within the research field. In the authors' experience of the peer review process, it is the lack of attention to detail that often prevents the successful publication of research. Often, research questions are important and have the potential to impact upon practice. However, if the methodology is casual, the analysis imprecise, and the writing careless, it appears not to matter how good or exciting the research question is, as the lack of attention to detail will prevent the research from being published.

The third key skill is to always consider the impact of your research upon practice. In working with athletes in an applied consultancy role, the aim is to always find a connection between research and the applied work conducted with those involved in the performance environment. This was difficult when conducting Study One (chapter 2), as developing a conceptual model and measurement tool seemed, at times, very far removed from my applied work. However, through investigating the conclusions drawn by researchers who have employed measurement tools within their research which are flawed (i.e., task subscale of TEOSQ measures hypothesised behavioural correlates, TEOSQ is competition irrelevant), the impact of the conclusions on practice can be potentially detrimental. For example, Duda, Olsen and Templin (1991) concluded than athletes who had high levels of ego orientation were more likely to approve of unsportsmanlike play and cheating. As the measurement tools that they employed were flawed (i.e., the questionnaire utilised to assess attitudes towards unsportsmanlike play included a question that focused upon approving of cheating in order to win, but no comparable question was included that focused on approving of cheating in order to improve performance), their conclusions may also be inaccurate. However, as a result of their findings, Duda *et al.* (1991)

suggested that coaches/parents/teachers should discourage high levels of ego orientation in their athletes. As the current programme of research has demonstrated, when measured accurately, high levels of ego orientation are not detrimental (i.e., lack of process focus, low levels of self-determined motivation, high levels of tension), when combined with strong performance or mastery climate and low levels of social approval ego or high levels of social approval task. Therefore, the reliability and validity of the measures employed within sport psychology research has a direct effect upon the applied implications of the research, and may impact upon the practice of applied sport psychologists, coaches, teachers, and athletes.

The impact of the results of Studies Two (chapter 3), Three (chapter 4), and Four (chapter 5) upon practice are more obvious. To assist athletes in maintaining a process focus when performing, high levels of self-directed task and low levels of social approval ego should be encouraged. In addition, high levels of self-directed ego do not prevent a process focus, so there is no need to discourage high levels of self-directed ego in athletes when maintaining a process focus is important. To promote high levels of self-determined motivation and low levels of tension, high levels of ego orientation (as measured by POSQ or PGOQ) should be matched with a strong performance climate and low levels of social approval ego. If an athlete has low levels of ego orientation, this should be matched with a strong mastery climate. When I engage in applied work (i.e., psychology consultant, coach, athlete), especially when working with elite athletes, high levels of self-directed ego orientation are never discouraged and low levels of social approval ego are encouraged by the author. This reinforces the applied implications of the findings of the current programme of research.

If I were to repeat this process, I would change two aspects of the research programme. This PhD was completed on part-time basis, working part-time with athletes in a psychology consultant role as a means of finding the PhD. This research:applied work ratio was difficult to maintain at times, especially when the applied work was more time consuming (i.e., world championships, Olympic games). This resulted in the research work being intermittent and inconsistent, with the research programme momentum being lost on occasions. However, the opportunity to engage in applied work would not be changed, as maintaining contact with athletes (a) highlighted the link between research and practice, (b) was thoroughly enjoyable, and (c) provided valuable experience for my desired career pathway. If the process was to be repeated, an attempt would be made to minimise the impact of the applied work upon the research process by being more disciplined with my time whilst working with athletes (e.g., reading research articles while attending training camps).

Another aspect of the research programme that I would change is the level of collaboration with other researchers in one of the studies. Study One (chapter 2) involved collaborating with researchers who were responsible for a portion of data collection. Due to difficulties with data collection, there was a delay in receiving the data from these researchers, which held up the research project. If the process was to be repeated, an attempt would be made to minimise the level of collaboration with a large number of other researchers. Research collaboration may not be a problematic issue in general, and appears to be a widely employed method for conducting research projects. However, due to the time constraints placed upon PhD students, being reliant upon others can be a difficult situation to manage effectively.

In general, this programme of research has been a challenging but extremely enjoyable process. The skills learnt throughout will enable me to conduct research

independently with a great degree of confidence and enthusiasm. Even with the benefit of hindsight, I would change very few aspects of the research process, which is an indication of the high level of leadership and guidance shown in the supervision of the programme of research.

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Appendix: Profile of Goal Orientation Questionnaire (PGOQ)

Feeling successful and gaining a sense of achievement are factors that are important to most, if not all, sports men and women. However, what success and achievement mean to one person might be totally different from what they mean to another. In other words, different athletes may feel successful or gain a sense of success by achieving entirely different things from their involvement in sport. Below is a list of statements that describes how athletes may gain an overall sense of achievement when playing their sport. Please circle the degree to which each statement is a true or untrue reflection of you.

There are no right or wrong answers to these questions and your responses are completely confidential. Therefore, please be as honest as possible. When a statement refers to others or other people, these relate to people that are part of your sport involvement, such as coaches, parents, team mates, opposition and friends.

I feel successful in my sport when...	Never True					Always True
1. I have fewer weaknesses than other competitors	1	2	3	4	5	6
2. I perform to the best of my ability	1	2	3	4	5	6
3. I show other people that I am more effective than my opponents	1	2	3	4	5	6
4. I impress others by mastering something new or difficult	1	2	3	4	5	6
5. I am more skilled than my opponents	1	2	3	4	5	6
6. I show others that I can beat other performers	1	2	3	4	5	6
7. I correct my own mistakes or weaknesses	1	2	3	4	5	6
8. I impress others by the quality of my individual performance	1	2	3	4	5	6
9. I achieve more than others	1	2	3	4	5	6
10. I show others that I can produce a high level of personal skill	1	2	3	4	5	6
11. I improve myself	1	2	3	4	5	6
12. I show others that my strengths as a performer are greater than the opposition	1	2	3	4	5	6
13. I prove to myself that I have the skills that are superior to the opposition	1	2	3	4	5	6
14. I better my standards	1	2	3	4	5	6
15. I prove to others that I am superior to the opposition	1	2	3	4	5	6
16. I perform to a level that reflects personal improvement	1	2	3	4	5	6
17. I show other people that I can out perform other performers	1	2	3	4	5	6
18. I make fewer mistakes than other competitors	1	2	3	4	5	6
19. I execute my skills to a levels others would expect of me	1	2	3	4	5	6
20. I put in a high standard of personal performance	1	2	3	4	5	6

SDT = items 2, 7, 11, 14, 16, 20; SDE = items 1, 5, 9, 13, 18; SAT = items 4, 8, 10, 19; SAE = items 3, 6, 12, 15, 17