THE DEVELOPMENT, VALIDATION AND IMPLEMENTATION OF THE MULTIDIMENSIONAL MOTIVATIONAL CLIMATE OBSERVATION SYSTEM IN SPORT

By

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ABSTRACT

Grounded in an integrated framework (Duda, 2013) that pulls from achievement goal theory (AGT; Nicholls, 1989) and self-determination theory (SDT; Deci & Ryan, 2000) framework, the current thesis presents the steps taken to develop and test the Multidimensional Motivational Climate Observation System (MMCOS) in sport. Almost exclusively, research examining the motivational coaching environment from an AGT and/or SDT perspective has relied on athletes' self-reports of the environment. Few studies have used an observational methodology to rate objective features of the coaching environment as emphasized within AGT and SDT-based research, and no studies have integrated AGT and SDT to provide an objective assessment of the motivational environment. To address these limitations, the thesis begins by outlining the development and validation of the MMCOS in Chapter 2. In Chapter 3, the MMCOS is used to examine the relationship between observed and perceived dimensions of the coaching environment and subsequent relations with athlete motivation. Following this, the objectively rated motivational environment is examined in training and match contexts (Chapter 4). Finally, the MMCOS is employed to further understand the dynamics of the observed and perceived motivational coaching environment in an elite sport setting (Chapter 5). Findings from the present set of studies provide initial evidence for the reliability and validity of the MMCOS when utilized within different samples (i.e., grassroots and elite) and contexts. In the future, the MMCOS could be used alongside self-report measures and provide an alternative assessment of the coach-created motivational environment in sport, as well as contribute to the evaluation of coach-education programmes grounded in an AGT and SDT perspective.

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I would like to dedicate this thesis to my Grandparents, John and Matilda Stirland, who both sadly passed away during the course of my studies.

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LIST OF PAPERS

The thesis is comprised of the following four papers where Nathan Smith was responsible for study design, data collection, data analysis and writing. Prof. Joan Duda, Dr. Eleanor Quested and Dr. Paul Appleton advised on study design, data analysis and edits to papers. The listed secondary and co-authors also advised on study design, analysis and paper preparation and editing.

1. **Smith, N.,** Tessier, D., Tzioumakis, Y., Quested, E., Appleton, P., Sarrazin, P., Papaioannou, A., & Duda, J. L. (2015). Development and Validation of the Multidimensional Motivational Climate Observation System (MMCOS). *Journal of Sport and Exercise Psychology. 37,* 4–22*.*

2. **Smith, N.,** Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., Sarrazin, P., Papaioannou, A., Balaguer, I., & Duda, J. L. (under review). The Relationship Between Observed and Perceived Assessments of the Coach-created Motivational Environment and Links to Athlete Motivation. *Psychology of Sport and Exercise*.

3. **Smith, N.,** Quested, E., Appleton, P., & Duda, J. L. (under review). Examining the Objective Coach-Created Motivational Environment across Training and Competition in Youth Sport. *Journal of Sport Sciences*.

4. **Smith, N.,** Quested, E., Appleton, P., Richardson, M., & Duda, J. L. (under review). Examining the Stability of the Multidimensional Motivational Coaching Environment in Academy Football. *Journal of Applied Sport Psychology*.

Whilst studying within the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham, the following articles and abstracts were accepts for publication/conference presentations.

Publications

5. Tessier, D., **Smith, N.,** Tzioumakis, Y., Quested, E., Sarrazin, P., Papaioannou, A., Digelidis, N., & Duda, J. L. (2013) Comparing the objective motivational climate created by grassroots soccer coaches in England, Greece and France. *International Journal of Sport and Exercise Psychology, 11,* 365 – 383

6. **Smith, N.,** & Healy, L. (2013). *Psyched for Sport Volume 1.* Birmingham, UK. Psyched4Sport Ltd.

7. **Smith, N.,** Quested, E., Appleton, P., & Duda, J. L. (Under review). A Review of Observational Instruments to Assess the Motivational Environment in Sport and Physical Education Settings. *International Review of Sport and Exercise Psychology.*

Conference Presentations

8. **Smith, N.** (2015). Psychological Responses to the Expedition Experience. Health and Safety in fieldwork, expeditions and adventure travel, Royal Geographical Society Conference, May, 2015.

9. **Smith, N.,** Tessier, D., Tzioumakis, Y., Fabra, P., Sarrazin, P., Digelidis, N., Papaioannou, A., Balaguer, I., Appleton, P., Quested, E., & Duda, J. L. (2015). Observational Research in the European-Funded PAPA Project; End of Project Findings. 14th FEPSAC European Congress of Sport Psychology, Bern, Switzerland, July 2015.

10. Tzioumakis, Y**., Smith, N.,** et al., (2015). Longitudinal effects of the Empowering CoachingTM programme on the observed coach behaviours in grassroots football across four European countries. International Society of Behavioural Nutrition and Physical Activity Annual Congress. Edinburgh, Scotland, June, 2015.

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12. Tzioumakis, Y., Tessier, D., **Smith, N.,** Papaioannou, A, Digelidis, N., Sarrazin, P, Quested, E., Duda J.L. (2013). Objective Assessment of the Coach-initiated Motivational Climate: An Observational, Multidimensional Approach. *15th Congress of ACAPS*, October 2013, Grenoble, France.

13. **Smith, N.,** Tessier, D., Tzioumakis, Y., Appleton, P., Quested, E., & Duda, J. L. (2013). The Relationship Between the Objectively Rated Coach-Created Motivational Climate and Athletes' Basic Psychological Needs and Sport Enjoyment. *Invited Lecture Japanese Society of Physical Fitness and Sports Medicine,* Tokyo, Japan, September 2013.

14. **Smith, N.,** Tessier, D., Tzioumakis, Y., Appleton, P., Quested, E., & Duda, J. L. (2013). The Relationship Between the Objectively Rated Coach-Created Motivational Climate and Athletes' Basic Psychological Needs and Sport Enjoyment. *European College of Sport and Exercise Science Conference,* Barcelona, Spain, June 2013 (Paper awarded 1st prize in the ECSS Young Investigator Award - oral presentation).

15. Sarrazin, P., **Smith, N.,** Tzioumakis, Y., Tessier, D., Quested, E., Papaioannou, A., & Duda, J. L. (2013) Correlates of the Objectively Assessed Empowering and Disempowering

Features of the Motivational Climate in Grassroots Football. *European College of Sport and Exercise Science Conference,* Barcelona, Spain, June 2013.

16. **Smith, N.,** Tzioumakis, Y., Tessier, D., Appleton, P., Quested, E., & Duda, J. L. (2013). Initial Examination of the Psychometric Properties of the Multidimensional Motivational Climate Observation System. *European College of Sport and Exercise Science Conference*, Barcelona, Spain, June 2013.

17. Tessier, D., Sarrazin, P., **Smith, N.,** Quested, E., Duda, J. L., Tzioumakis, Y., Papaioannou, A., & Digiledis, N. (2013) Comparing the Objective Motivational Climate Created by Grassroots Football Coaches in England, Greece and France. *Self-determination Conference,* Rochester, United States, June, 2013

18. Quested, E., Appleton, P.R., **Smith, N.,** Ntoumanis, N., & Duda, J.L (2013). Conceptualization and measurement of an empowering climate in youth sport: A Review of recent developments. *International Society For Behavioral Nutrition and Physical Activity*, Ghent, Belgium, May 2013.

19. Quested, E., Appleton, P.R., **Smith, N.,** Ntoumanis, N., & Duda, J.L. (2012). Advances in the measurement of the multidimensional motivational climate in sport. *Association for Applied Sport Psychology Annual Conference,* Atlanta, United States, October 2012.

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21. **Smith, N.,** Quested, E., Appleton, P., & Duda, J. L. (2012). Examining the relationship between the objective and perceived coach created motivational climate in youth sport. *British Psychological Society Annual Conference*, London, United Kingdom, April 2012

22. Tessier, D., Tzioumakis, Y., **Smith, N.,** Sarrazin, P., Digelidis, N., Papaioannou, A., Quested, E., & Duda, J. L. (2011). Development of an observational instrument assessing the coach-created environment. *13th FEPSAC European Congress of Sport Psychology*, Madeira, Portugal, July 2011

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CHAPTER 1.

GENERAL INTRODUCTION

Parts of this chapter are ‘under review’ at the *International Review of Sport and Exercise Psychology*

"We are in very grave danger of transforming the study of leadership to a study of self-report questionnaire behaviour, if, indeed the transformation has not already occurred…I submit that when both the independent and dependent variables are based on self-reports by the same person, we have learned absolutely nothing about leadership" Campbell, 1977

In 1977, expert in leadership research Professor John Campbell highlighted the importance of employing more diverse methods to examine the phenomenon of leadership. Around the same time period, Smith, Smoll and colleagues began a comprehensive line of 'coach effectiveness' research that centred on using an observational measure of coach behaviours alongside more typical self-reports (Smith & Smoll, 2007; Smith, Smoll & Hunt, 1977). Unlike self-report, observation is considered to be a valuable methodology for obtaining objective data on real life events (McCall, 1984). Observation is a process by which a trained individual "follows stated guidelines and procedures to observe, record, and analyse interactions" (Darst, Zakrajsek & Mancini 1989). For those observations to be considered reliable, it is expected that other trained observers, who view the same events, will agree with the recorded ratings. Since the pioneering sport-based research conducted by Smith, Smoll et al. in the context of Little League baseball in the US, observation has been employed to examine the behaviour and interactional styles of coaches working at different competitive levels and in a variety of different sports (Cushion, Harvey, Muir & Nelson, 2012; Kahan, 1999; Lacy & Darst, 1984; Smith & Smoll, 2007).

Two major social-cognitive theories of motivation that place importance on and help differentiate the type of coaching environment created, and the implications of the behaviours elicited by a coach, are achievement goal theory (AGT; Ames, 1992; Nicholls, 1989) and self-determination theory (SDT; Deci & Ryan, 1985, 2000). During the past two decades, researchers conducting studies based in AGT and/or SDT have consistently called for the

development of observational measures to objectively assess the motivational environment created by coaches in sport (Duda, 2001; Duda & Balaguer, 2007; Ntoumanis, 2012). It has been suggested that such measurement instruments could be used to validate players' self-reports of the coaching environment, employed to train coaches to create more motivationally adaptive environments, and/or be utilised in the evaluation of coach education intervention programmes intended to change coach behaviour (Duda & Balaguer, 2007; Healy, Ntoumanis, Veldhuijzen van Zanten & Paine, 2014; Ntoumanis, 2012).

To date, there has been a very limited attempt to use observation to measure the motivational environment created by coaches drawing from tenets and constructs embedded within AGT and SDT. Despite continued suggestions that observational measures could prove valuable to advancing the named theories (Duda, 2001; Duda & Balaguer, 2007; Harwood, Keegan, Smith & Raine, 2015), AGT and SDT-based research in sport has typically only considered athletes' perceptions of the coaching environment (Horn, 2002; Keegan, Spray, Harwood & Lavallee, 2011). Before considering the potential for observation systems grounded in AGT and/or SDT for rating the motivational coaching environment, the two theories will be briefly outlined.

Achievement Goal Theory

According to AGT (Nicholls, 1989; Roberts, 2001) there are at least two major goal states that reflect how an athlete construes and defines his/her competence. More specifically, an athlete could define their competence according to a task- and/or ego-involved goal (Duda, 2001). When an athlete is task-involved, competence judgements are primarily self-referenced and perceptions of success relate to exerting effort, mastering skills and meeting the demands of a task (Duda & Nicholls, 1992). If an athlete is primarily ego-involved, he or she tends to focus on other-referenced criteria to judge success such as outperforming other

athletes, demonstrating superior ability and/or winning by exerting minimal effort (Duda & Nicholls, 1992).

The extent to which an athlete is task- and/or ego-involved in a specific activity is believed to be dependent on two factors; 1) the athlete's goal orientation, which reflects dispositional tendencies in how success is judged and how competence is construed, and 2) the goal perspectives emphasised by the motivational climate at hand, which is created by significant others such as the coach (Duda & Balaguer, 2007; Dweck & Leggett, 1988). In the AGT literature, the term 'motivational climate' originally referred to the way the psychological environment created by a teacher could encourage students to become more or less task- and/or ego-involved in an activity (Ames, 1992; Butler, 1987). In the context of sport, a coach could engage in task-involving behaviours, which are assumed to make it less likely for the athletes in question to adopt a task-involved goal focus. A coach may also create a strongly ego-involving motivational climate that encourages athletes to adopt an ego-involved goal focus (Duda & Balaguer, 2007).

Perceptions of the coach-created motivational climate have been predominantly assessed using one of two self-report questionnaires. Initial research into the motivational climate in sport used the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifrez, Duda & Chi, 1992). The PMCSQ assessed athletes' perceptions of the goal perspectives emphasised in the setting, and labelled these as mastery (i.e., task-involving) and performance (i.e., ego-involving) oriented climates. More recent studies have used the later iteration of the measure, the Perceived Motivational Climate in Sport Questionnaire-2 (Newton, Duda, & Yin, 2000). The PMCSQ-2 extended the PMCSQ by including multiple subscales tapping the task- and ego-involving dimensions of the climate thereby creating a hierarchical and multidimensional assessment of the motivational climate. For a task-involving climate, there were three subscales assessing athletes' perceptions of cooperative

learning, effort/improvement and role importance. The ego-involving climate subscales tapped athletes' perceptions of intra-team member rivalry, unequal recognition and punishment for mistakes. Throughout its use in the research, the PMCSQ-2 has been demonstrated to be a valid and reliable assessment of the motivational climate in sport and has been used in numerous studies since its development (Duda & Whitehead, 1998; Harwood, Keegen, Smith & Raine, 2014; Newton et al., 2000; Roberts & Treasure, 2012).

To date, a considerable number of studies have examined the relationship between perceived task- and ego-involving motivational climates and athlete responses in the sport setting (see Duda, 2005; Duda & Balaguer, 2007; Ntoumanis & Biddle, 1999). For example, athletes' perceptions of task-involving climates have been associated with perceptions of competence (Reinboth, Duda & Ntoumanis, 2004), reported enjoyment (Boixados, Cruz, Torregrosa, & Valiente, 2004) and more positive moral functioning (Ommundsen, Roberts, Lemyre, & Treasure, 2003). Conversely, athletes' perceptions of an ego-involving motivational climate have been positively related to anxiety (Pensgaard & Roberts, 2000), dropping out of sport (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002) and self-handicapping (Ryska, Yin, & Boyd, 1999).

Self-determination Theory

SDT is a social-cognitive theory of motivation that explains how and why individuals are motivated when engaging in a particular context (Deci & Ryan, 1985; 2000). According to SDT, the implications of the social environment, created by one or more significant others, for the quality of an individual's motivation and optimal functioning is not direct. Rather, it is assumed to occur as a result of the satisfaction and/or thwarting of the basic psychological needs for autonomy, competence and relatedness (Ryan & Deci, 2000). Autonomy refers to the extent to which individuals perceive they are the origin of their decisions and are acting according to their own interests and preferences (Deci & Ryan, 1985). When competence

need satisfaction is fulfilled individuals perceive they can effectively interact with the environment and feel a sense of mastery (Deci & Ryan, 1985). Finally relatedness is realised when individuals' experience feelings of security, and attachment and a sense of being respected by and cared for by others (Deci & Ryan, 1985).

Traditionally, SDT-based researchers in sport focused heavily on the extent to which the social environment created by a coach supported athletes' basic psychological need satisfaction based on the degree to which the coach is autonomy supportive (e.g., Deci & Ryan, 2002; Mageau & Vallerand, 2003; Vallerand & Losier, 1999). Mageau and Vallerand (2003) identified seven strategies that they considered to constitute an autonomy-supportive coaching style. These were, providing choice to their athletes within specific limits and rules; providing athletes with a meaningful rationale for the activities, limits and rules; asking about and acknowledging the athletes' feelings; providing opportunities for athletes to take initiative and act independently; providing non-controlling performance feedback; avoiding overt control, guilt inducing criticisms, controlling statements, and limiting their use of tangible rewards; and minimizing behaviours that promote ego-involvement. A number of findings support the positive association between athletes' perceptions of autonomy-supportive coaching and athletes' basic psychological need satisfaction (e.g., Adie, Duda & Ntoumanis, 2008; Amorose & Anderson-Butcher, 2007; Gagne, Ryan & Bargman, 2003; Kipp & Amorose, 2008; Reinboth et al., 2004) as well as more self-determined motivation and positive responses such as increased enjoyment and satisfaction with the sport experience (see Ntoumanis, 2012 for a summary).

Although the majority of SDT-based sport research on the social environment has centred on autonomy support (Bartholomew et al., 2009), researchers have identified additional dimensions of the coaching environment that are likely to have direct implications for athletes' feelings of autonomy, competence and relatedness (Reinboth et al., 2004;

Mageau & Vallerand, 2003). The extent to which an environment is structured and interpersonally involving is also assumed to be relevant to need satisfaction. Structure has been defined as the amount and clarity of information provided by a significant other such as a coach (Skinner & Belmont, 1993; Jang, Reeve & Deci, 2010). A structured environment will be characterised by clear and explicit expectations, strong guidance, and competence-enhancing feedback (Curran et al., 2013; Jang et al., 2010). Interpersonal involvement refers to the extent to which a leader, such as a coach, is dedicated to their athletes, and puts time and energy into the relationship (Grolnick & Ryan, 1989; Mageau & Vallerand, 2003; Reinboth et al., 2004).

In addition to dimensions of the environment that are likely to satisfy the basic psychological needs, SDT also asserts that certain types of social environments are likely to thwart the basic psychological needs by being controlling (Pelletier, Fortier, Vallerand & Briere, 2001; Tessier, Sarrazin & Ntoumanis, 2008). Such environments can contribute to the active blocking or diminishing of athletes' sense of autonomy, competence and relatedness. Drawing from research into parenting, Skinner and Edge (2002) identified six dimensions of the environment that are likely to hold implications for basic psychological need satisfaction and thwarting. These include the extent to which the coach is autonomy supportive and controlling whether the environment is structured or chaotic, and how interpersonally involved or hostile the authority figure is perceived to be. Recent developments in the literature have seen researchers exploring the relationship between controlling dimensions of the sport environment and athletes' reported feelings of need thwarting. Bartholomew. Ntoumanis and Thogersen-Ntoumani (2009) reviewed the literature and identified 6 types of controlling coaching strategies; i.e., tangible rewards, controlling feedback, excessive personal control, intimidation behaviours, promoting ego-involvement, and conditional regard. Subsequently, Bartholomew et al., (2010) developed the Controlling Coach Behavior

Scale (CCBS) and examined the relationship of coaches' controlling interpersonal style to athletes' perceptions of psychological need thwarting and outcomes such as burnout and negative affect (Bartholomew et al., 2011). Previous attempts to examine controlling coach behaviour also highlight the potential negative implications of emphasizing controlling criteria, such as using extrinsic rewards (Medic, Mack, Wilson & Starkes, 2007; Ryan, 1980). To our knowledge, no studies (self-reported or observational) have specifically assessed chaotic or hostile dimensions of the social environment in sport.

Similar to the work in AGT, sport-based studies examining dimensions of the social environment and their concomitants as emphasised within SDT have relied almost exclusively on self-report measures. In sport, researchers have often adapted items from the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan & Deci, 1996) as well as the Sport Climate Questionnaire (Hagger, Chatzisarantis, Culverhouse & Biddle, 2003) to assess athletes' perceptions of autonomy support. These measures have been shown to be valid and reliable assessments of autonomy support in a number of studies (Adie et al., 2008; Joesaar, Hein & Hagger, 2012; Reinboth et al., 2004). Several other measures have been amended or developed to assess autonomy supportive aspects of the coaching environment including the Perceived Autonomy Support Scale for Exercise Settings (PASSES; Hagger, Chatzisarantis, Hein et al., 2007) used by Gillet, Vallerand, Amoura and Baldes (2010) and the Autonomy Supportive Coaching Questionnaire (ASCQ) developed by Conroy and Coatsworth (2007).

In an attempt to examine relatedness supportive features of the coaching environment, Reinboth et al., (2004) used the short form of the Social Support Questionnaire (SSQ6; Sarason, Sarason, Shearin, & Pierce, 1987) and Fry and Gano-Overway (2010) used the Caring Climate Questionnaire (CCQ). To tap athletes' perceptions of coach provided structure, Curran et al., (2013) used a modified version of the Teacher as Social Context

Questionnaire (Belmont, Skinner, Wellborn & Connell, 1988). In contrast to examining need-supportive features of the coaching environment, Bartholomew and colleagues (Bartholomew et al., 2010; 2011) have developed and employed the CCBS in a series of studies to assess the controlling dimensions of the coaching environment.

A Theoretically Integrated Conceptualisation of the Coach-Created Motivational Environment

Based on the tenets of SDT, AGT and a plethora of related evidence (Liukkonen, Barkoukis, Watt & Jaakkola, 2010; Ntoumanis, 2001; Quested & Duda, 2010; Reinboth et al., 2004; Sarrazin; Vallerand; Guillet, Pelletier & Cury, 2002), it has recently been proposed that more adaptive environments would be those that would foster an athletes' basic psychological need support. Accordingly, these would be characterized as highly autonomy supportive, relatedness supportive, task-involving and structured. A motivational climate that is high in these characteristics has been conceptualised by Duda (2013) as being more empowering. Duda argues that empowering sport environments are likely to promote more intrinsic and self-determined forms of motivation by satisfying athletes' autonomy, relatedness and encouraging task-referenced perceptions of competence.

In contrast, Duda suggested that environments marked by controlling, relatedness-compromising and ego-involving coach behaviours could be classified as more disempowering (Duda, 2013). Disempowering motivational climates are assumed to contribute to less self-determined and more controlled forms of motivation, by promoting low levels of need satisfaction and indeed, even thwarting of the basic psychological needs of autonomy, relatedness and competence, while also encouraging other-referenced conceptions of competence.

Findings of previous research support the multidimensional view of the motivational coaching environment offered by Duda (2013) and highlight the value of considering key

facets of the environment simultaneously. In a sample of adult athletes, Reinboth et al., (2004) showed that autonomy supportive, task-involving and socially supportive dimensions of the environment predicted athletes' autonomy, competence and relatedness respectively. In a more recent study, Quested and Duda (2010) found that in vocational dance settings dancers' perceptions of autonomy supportive, task-involving and ego-involving environments accounted for unique variance in their basic psychological need satisfaction. Research that has examined features of the motivational environment drawing from AGT and SDT has exclusively relied on athletes' reports of the environment. At present there are no available observational systems that integrate concepts from AGT and SDT that can be used to rate empowering and disempowering features of the motivational coaching environment in sport.

Establishing Validity and Reliability of Motivation-based Observation Systems in Sport

Within sport based research there has been a limited attempt to observe and rate motivationally-relevant features of the coaching environment. From an AGT perspective, Boyce, Gano-Overway & Campbell, (2009) used a checklist to rate task- and ego-involving features of the motivational climate. Grounded within SDT, Webster, Wellborn, Hunt, LaFleche, Cribbs and Lineberger (2013) developed an objective rating system to code the autonomy supportive coach behaviours. In contrast to sport-based research, there have been a number of attempts to observe AGT and SDT-based dimensions of teacher behaviour in physical education settings (e.g., Curtner-Smith & Todorovich, 2002; Morgan et al., 2005; Reeve, Jang, Carrell, Jeon & Barch, 2004; Sarrazin, Tessier, Pelletier, Trouilloud & Chanal, 2006). Establishing the validity and reliability of new observational measurement systems or those amended from PE settings is important for researchers hoping to employ observational measures in the future.

Brewer and Jones (2002) proposed a set of criteria to establish validity and reliability when developing new observational measurement systems in sport. The process proposed by

Brewer and Jones includes (a) training observers, (b) amending an instrument to be context specific, (c) establishing face validity, (d) establishing inter-observer reliability, and (e) confirming intra-observer reliability. Although these steps have been employed by different sport-based researchers (e.g., Cushion et al., 2012; Webster et al., 2013), there are a number of additional steps that can be taken to psychometrically evaluate the validity of data collected using different measurement such as self-report questionnaires. Schutz and Park (2004) emphasised the importance of establishing validity and suggested that to determine the "value, applicability and generalizability" (p. 78) of research findings, it is critical that measures be valid. Although there are different schools of thought regarding validation procedures (Messick, 1995; Zimiles, 1996), Yoder and Symons (2010) provide an explanation on the types of validation specifically focusing on observation-based research specifically. In total, 5 types of validation were identified which are dependent on the purpose and use of the observational measure in question. Typically these processes mirror the generic validation procedures used to establish the psychometric properties of self-report scales used in sport and exercise psychology research (Duda, 1998; Schutz & Park, 2004). These include (a) content validity, (b) sensitivity to change, (c) treatment utility, (d) criterion related, and (e) construct validity.

In brief, content validity refers to whether the definitions and scale descriptors are representative of the variable(s) being observed. Sensitivity to change is related to the extent to which a measure changes following the administration of a treatment or intervention. Similarly, treatment utility deals with the extent to which a measure taps change in an assessed variable. However, compared to sensitivity to change, treatment utility provides information on whether a targeted outcome changes over and above other assessed variables. For example, in an intervention designed to enhance autonomy supportive coaching, coach autonomy support should demonstrate greater change when compared to other assessed

dimensions of the coaching environment (e.g., structure). Criterion-related validity is established by comparing the association between one variable and a known gold standard. Evidence for criterion-related validity can be either concurrent (measured at the same time) or predictive (measured at different times). Finally, construct validity is established using correlational (nomological) or experimental (discriminative) methods to test relationships based on theoretical assumptions (Cronbach & Meehl, 1955).

Questions of reliability for objective measures typically relate to the extent to which inter- and intra-observer reliability can be demonstrated. Inter-observer reliability is established by comparing the ratings made by two or more coders. In contrast, intra-observer reliability relates to whether an individual can rate reliably over time. This is usually determined by asking an observer to code the same footage on two separate occasions with a time-lag of 2 weeks or more between ratings (Brewer & Jones, 2002). A number of different statistics are used to determine the extent to which two or more ratings are reliable. The most popular tests include examining percentage agreement (Sidentop, 1977) or using statistics such as Cohen's Kappa (Dijkstra, 2014) or an Intraclass Correlation Coefficient (Portney & Watkins, 2009).

Observing Motivationally-Relevant Dimensions of Coach Behaviour

As mentioned above, a number of coach observation systems exist and have been used to examine coach behaviour in past sport-related research (see Darst et al., 1989; Kahan, 1999 for early reviews). Although these early observation systems may contain categories related to motivational aspects of the coaching environment, they were not developed drawing specifically from the tenets of either AGT or SDT, or indeed any other motivation-based theoretical framework. For example, Smith, Smoll and Hunt (1977) employed a social-reinforcement theory lens in developing the Coaching Behaviour Assessment System (CBAS; Smith & Smoll, 2007) to assess various discrete dimensions of coaching behaviour. Other

systematic observation instruments (e.g., Arizona State University Observation Instrument, ASUOI; Lacy & Darst, 1984; the Coach-Athlete Interaction Coding System, CAICS; Erickson, Cote, Hollenstein & Deakin, 2011; and the Coach Analysis and Intervention System, CAIS; Cushion et al., 2012) have not been grounded in a specific theoretical framework but aimed to identify the discrete behaviours utilised by coaches in a variety of sports. The CBAS, ASUOI, CAICS and CAIS have demonstrated good reliability and validity, but it should be noted that all of these instruments target the frequency of coach behaviour. What has been less well captured in the aforementioned observation systems is the psychological meaning of the coaches' behaviour (i.e., as interpreted via the lens of motivation-centred theory or theories). As a result, it is difficult to specify and explain the implications of coach behaviours (as assessed via these systems) on constructs considered central to AGT and SDT, such as athletes' psychological needs and motivation.

Coach Behaviour Observation from an AGT and SDT Perspective

Observational Checklist of the Motivational Climate Boyce, Gano-Overway, and Campbell (2009) drew from AGT to develop the motivational climate observation checklist. Boyce et al., (2009) cite observation tools developed in educational settings by Xiang, McBride, and Solmon (2003), and Patrick, Anderman, Ryan, Edelin, and Midgley (2001) as a starting point for developing the observation checklist. To assess features of the coach-created motivational climate as task-involving and ego-involving, the TARGET (Task, Authority, Recognition, Grouping, Evaluation, & Time) principles proposed by Epstein (1989) and further developed by Ames (1992) were adopted. The TARGET framework was initially developed to support teachers or coaches to create a task-involving climate. Task refers to the what athletes are asked to learn; Authority refers to the type of involvement given in decision making; Recognition is related to when and how progress and achievement is recognised; Grouping is associated with how athletes are brought together or kept apart

during training; Evaluation relates to when performance and learning have been attained and the process for monitoring this; Time is whether the pace of learning is appropriate and how much time is given to master a skill. In total, the observation checklist has 28 strategies organised according to the TARGET principle framework (see table 1). In a pilot study, the checklist was used to rate 4 one-hour long soccer sessions and items were reviewed to confirm the content validity of the measure (pilot study information is available from Boyce et al., on request).

The checklist has since been used to examine the relationship between coaches' and athletes' perceptions of the motivational climate in relation to researchers' ratings of the coaching climate (Boyce et al., 2009). Typically the relationships between researcher ratings and coaches' perceptions of the same environment dimensions (i.e., task- and ego-involving) were small to moderate (Range 0.39 – 0.46). Relationships between researcher ratings and athletes' reports were weaker (Range 0.11 – 0.38). These findings are in contrast to previous work by Curtis, Smith and Smoll (1979) who, utilising the CBAS, suggest that athletes more accurately report the coaching environment than coaches themselves.

Initial research conducted by Boyce et al., (2009) supports inter-rater reliability (i.e., between r = 0.89 - 0.97), content and criterion-related validity of data collected using the observational checklist. However, at present the observational checklist has only been employed to rate a small number of coaches from one school. In addition, there is currently no information on the construct and predictive validity of the checklist measure.

MPOWER Autonomy Support Observation System Grounded in the SDT framework, Webster and colleagues (Webster et al., 2013) developed the MPOWER autonomy support observation system to rate the autonomy supportive strategies utilised by coaches in youth soccer. The 6 strategies included in the MPOWER observation system are reflective of the motivational behaviours identified as autonomy supportive by Mageau and Vallerand in

2003. In brief, the behavioural strategies include player focus of decision-making, prompts for player feelings, using player ideas, guiding responses, empathising with negative affect and rationalising decisions (see Table 1 for more information).

Following the guidelines provided by Brewer and Jones (2002), Webster et al., (2013) conducted a series of validity and reliability checks of the MPOWER system. Content validity was established by coding multiple videos, discussing similarities and differences between observer ratings, and modifying definitions to ensure observers could accurately identify the 6 autonomy supportive strategies included in the system. The reliability of the resulting MPOWER system was examining by comparing the ratings made by the 2 lead authors (using the first author code as the gold standard) (Webster et al, 2013). After the initial reliability check, 2 graduate students rated the footage and compared their scores to the gold standard rating made by the lead researcher involved in the development of MPOWER. Although Webster et al., (2013) report a good degree of reliability, the initial reliability scores were below the acceptable level of 85% (Siedentop, 1976). In an attempt to address the initial low reliability scores, observers were asked to discuss and recode footage, which resulted in the high degree of agreement reported in Webster et al. (2013). Intra-observer reliability assessments suggest a very high degree of agreement when using the MPOWER system over time.

From a SDT perspective, a key limitation of MPOWER is the focus on only autonomy supportive coaching behaviours. Although autonomy support has typically been the main focus of SDT-based research on the coaching environment (Amorose, 2007; Bartholomew et al., 2009), there are several other dimensions of the social context which have been found to be relevant to need satisfaction or thwarting. Although Webster and colleagues (2013) acknowledged the sometimes-controlling nature of youth sport, they did not include any controlling coaching strategies within the MPOWER system. This is

surprising given the identification of a number of controlling coach behaviours by Bartholomew et al. (2009. Moreover, the extent to which a coach supports and/or thwarts an athletes' sense of competence and relatedness by being interpersonally involved and hostile, and provides structure or chaos vis a vis his or her behaviour could also have been considered (Haerens, Aelterman, Van den Berghe, De Meyer, Soenens & Vansteenkiste, 2013; Mageau & Vallerand, 2003; Skinner & Edge, 2002). In future research, evidence for the predictive capabilities of the MPOWER system should be sought. If MPOWER is to help reduce reliance on the self-reported methods of the social environment operating in sport (Ntoumanis, 2012), the extent to which the included strategies can predict key motivational processes such as the basic psychological needs and motivational regulations is essential. Nevertheless, the work of Webster and colleagues (2012) should be applauded as it reflects the first attempt to objectively observe aspects of an autonomy supportive environment in sport. As such, it provides a starting point for future research in the area.

PE Teacher Behaviour Observation Systems from an AGT and SDT Perspective

In contrast to the limited attempts to observe motivational dimensions of the coaching environment in sport, a number of studies have employed observational measures to examine motivational dimensions of the environment created by teachers in PE (Cheon et al., 2012; Haerens et al., 2013). Although there are seemingly differences in the goals of sport and PE, the roles and behaviours of a PE teacher and coach have considerable overlap. Both a coach and PE teacher aim to educate and engage their students and athletes respectively to promote skill development, knowledge accrual and optimise performance. Moreover, the principles of adaptive and maladaptive motivational environments, as highlighted by AGT and SDT, are considered to be applicable to both sport and physical education contexts (see Roberts & Treasure, 2012). As such, valid and reliable observational systems developed for the PE setting could be modified and used to examine the environment created by coaches in sport

settings. Observation measures that have been used to observed motivational dimensions of PE teacher behaviour will be reviewed in the next section.

Physical Education Climate Assessment Instrument Grounded in the AGT framework, the Physical Education Climate Assessment Instrument (PECAI; Curtner-Smith & Todorovich, 2002) provides a system for observers to classify features of the teacher-initiated environment as task-involving, ego-involving or neutral (if it cannot be identified as task- or ego-involving). Similar to the checklist developed by Boyce et al., (2009), the dimensions of the PECAI were derived from Epstein's (1989) TARGET framework. When using the PECAI, each behavioural event (i.e., the discrete teacher-student interactions) can be examined and coded according to the six previously described TARGET dimensions. Since the development of the PECAI, researchers have employed the measure to determine whether a motivational climate manipulation in PE settings was successful in fostering a task- and/or ego-involving motivational climate (Todorovich & Curtner-Smith, 2002; 2003). In two similar studies, Todorovich and Curtner-Smith (2002; 2003) used the PECAI and demonstrated that manipulated lessons were accurately classified as task-involving, ego-involving or neutral, providing evidence for the validity of data collected using the PECAI. Based on the development of the measure and aforementioned findings, evidence exists for the content validity and treatment utility of the measure. Inter- and intra-observer reliability assessments using the PECAI yielded percentage agreements between 85% and 100% (Todorovich & Curtner-Smith, 2002; 2003), surpassing the accepted cut off of 85% identified by Siedentop in 1976.

At present there is no information on the construct, criterion-related and predictive validity of the PECAI. In addition, the rating procedure adopted appears to oversimplify the complexity of the motivational climate. Coders are instructed to rate each behavioural event as either task-involving, ego-involving or neutral. It is possible that during a teacher-student

interaction both task- and ego-involving information can be communicated and this could be delivered with varying degrees of emphasis. Rating dimensions of the climate simultaneously would provide more information on the motivational implications of teacher behaviour and aligns with recent findings that highlighted the value of examining dimensions of the environment in parallel (Quested & Duda, 2010).

Computer-based Observational Measure of TARGET Behaviours Similar to Boyce et al., (2009) and Curtner-Smith and Todorovich (2002), Morgan, Sproule, Weigand and Carpenter (2005) drew from the TARGET framework proposed by Epstein (1989) to produce a computer-based observational system to code the objective teacher-created motivational climate in PE. Using the observation system developed by Morgan et al., (2005), coders provide both a frequency and duration rating of behaviours related to the six TARGET dimensions. Across the 6 dimensions, behaviours can be classified as task-involving, ego-involving or neutral by selecting the appropriate key from the keyboard. Morgan et al., (2005) found that there was a degree of congruence between what was observed and what was perceived by students. Morgan et al., (2005) identified that independent observations and student perceptions showed congruence in rating the targeted climate as high mastery (i.e. task-involving) (M student perception = 4.03; M teacher observation = 4.14) and moderate to low performance (i.e., ego-involving) (M student perception = 2.86; M teacher observation = 1.82), providing initial evidence for the criterion-related validity of the measure. In a later study, Morgan and Kingston (2010) used the computer-based observation system to examine the effect of an intervention designed to aid teachers in creating a more mastery-focused (i.e., task-involving) motivational climate. Results suggest that post-intervention teachers were observed to emphasise a more task-involving climate, indicating that ratings made using the observational system are sensitive to change and could be used to evaluate effects in future

intervention studies (i.e., construct and sensitivity-to-change aspects of validity were demonstrated; Morgan et al., 2005; Morgan & Kingston, 2010).

Morgan et al., (2005) reported both inter- and intra-observer reliability as 100%. This is due to the fact that observers could rewind and code the teacher behaviour as many times as they like while discussing the differences in coding selection. For future researchers this approach is likely to be time consuming and may limit the amount of observations that can realistically be coded (reducing the sample size of the study). In addition, without the computer software, the observational measure may be rendered impractical. It may be important to streamline the coding process (perhaps by changing from a frequency-type approach) and create an offline (i.e., paper and pencil) version of the instrument. This might increase the likelihood of other research groups using the measure in the future. For research groups who are unable to purchase the computer software, this would certainly make the observation system more accessible. However, if a paper and pencil version of the measure is developed it will important to revaluate the reliability of the observation system. Attempts should also be made to examine the construct and criterion-related validity of the observational system.

Qualitative Assessment of the Teacher-Created Social Environment In their work in mainstream education, Reeve and colleagues (Reeve et al., 2004) drew from a SDT perspective to develop an observation rating system to assess the extent to which a teacher is autonomy supportive versus controlling, interpersonally involved versus hostile, and provides structure versus chaos in classroom-based settings (see Table 1 for list of strategies). Although the majority of SDT-grounded research using observational rating systems has been conducted in the classroom (Reeve et al., 2004; Jang et al., 2010), 3 studies have also employed the qualitative rating system in sport, exercise and PE settings (Cheon, Reeve & Moon, 2012; Edmunds, Ntoumanis & Duda, 2008; Tessier, Sarrazin & Ntoumanis, 2010). A

recent study employed the Reeve social environment rating scale to evaluate the effectiveness of a teacher-training programme designed to promote more autonomy supportive teaching in PE settings (Cheon et al., 2012). Cheon et al., (2012) found that post-training PE teachers in an intervention group were more autonomy supportive than those in the control condition, providing evidence for the sensitivity of the measure.

Throughout research using the observation system, Reeve and colleagues have reported consistently high levels of observer agreement. The high level of reliability has been confirmed using a slightly amended version of the measure in a study of PE teachers (Tessier et al., 2010) (range Kappa – 0.72 – 0.91). However, when used to observe instructors in exercise settings, observed correlations were lower. This was particularly the case for the dimension of structure (r = 0.33) (Edmunds et al., 2008). Therefore, it is important to confirm the reliability of the measure when used to observe coaches in sport. One potential shortcoming of the observational system developed by Reeve et al., is that the environmental dimensions are situated on a continuum; autonomy support is at one end and controlling at the other, and the same applies with interpersonal involvement and hostility, as well as structure and chaos. Adopting this approach would suggest that if a coaching climate is high in autonomy support, then it cannot also be at least moderate if not high in controlling features. Recent developments have led researchers to suggest that in fact autonomy support and control are related but may not be polar opposites (Bartholomew et al., 2010; Haerens et al., 2013). This means that it may be necessary to assess both dimensions of the environment on separate scales (Bartholomew et al., 2010; Haerens et al., 2013). Nevertheless, the rating system developed and approach adopted by Reeve and colleagues (2004), has performed well in previous studies. The system is able to discriminate between teacher autonomy support pre- and post-training (Cheon et al., 2012), and has also demonstrated validity in terms of the prediction of theoretically- expected motivation-related outcomes (Reeve et al., 2004).

Observational Grid of Instructional Type and Nature Sarrazin et al., (2006) developed an SDT-based observation instrument to assess the type and nature of teacher-student interactions. For each verbal interaction, observers identified the type of behaviour used by the teacher (e.g., organisational communication, technical and tactical hints, and questions) as well as the nature of the behaviour (i.e., was it autonomy supportive vs. controlling vs. neutral). This measure has since been modified and used by Tessier, Sarrazin and Ntoumanis (2008) to assess autonomy supportive, neutral and controlling teacher behaviours in PE settings before and after a teacher-training intervention.

In an attempt to examine the construct validity of the observational grid, Sarrazin and colleagues conducted a factor analysis using the coded teacher-student interactions. The analysis resulted in four identifiable factors. The first two factors contained interactions related to control and autonomy support and were named accordingly. The final 2 factors were not named, but include utterances of encouragement and perspective taking statements, and criticisms. It is possible that these unnamed factors might represent other key SDT-relevant dimensions of the social environment that hold implications for an individual's motivation (Skinner & Edge, 2002) such as interpersonal involvement and hostility. In general, the results reported by Sarrazin et al., (2006) provide tentative support for the construct validity of the measure and evidence that dimensions of the observational grid are tapping into the constructs of autonomy support and control. Evidence for the discriminant validity of the measure has also been provided by Tessier et al., (2008) who showed that teachers used more autonomy supportive strategies following an autonomy supportive education intervention when post-intervention ratings were compared to assessments made at baseline.

In the 2 studies that have used Sarrazin et al's observational grid, high levels of both inter- (range r = 0.70 – 0.95) and intra- (range r = 0.75 – 0.98) observer reliability are

reported. This suggests that the observers can be trained to code with little measurement error when using the observational grid. A potential limitation of the research conducted so far is that both studies have had relatively small sample sizes; 7 teachers were recruited by Sarrazin et al., (2006) and 5 teachers by Tessier et al., (2008). It would therefore be interesting to examine the reliability of the observational grid when coding data obtained from a larger sample. It is important to examine the construct validity of the observational grid measure further, particularly the role of the unnamed factors. For the observational grid to contribute to future SDT-based research in sport the extent to which ratings can be used to predict athletes' responses in a theoretically consonant manner is also paramount. Therefore attempts to establish the criterion-related validity of the measure would be beneficial.

Observed Need-Supportive and Need-Thwarting Teaching Behaviours In a recent development in the literature which pulls specifically from Basic Needs Theory (Deci & Ryan, 2000), which is a sub-theory within the SDT framework, Haerens et al., (2013) and Van den Berghe Soenens, Vansteenkiste et al., (2013) have developed an observational instrument to examine the need-supportive and need-thwarting behaviours used by teachers in PE settings. Initial evidence is provided for the content, criterion-related and construct validity of the observation system. In two separate studies the 35 (initially 37) motivational strategies included separated onto 7 factors. These factors represent autonomy supportive, interpersonal involvement, structure before, structure during the learning process, controlling, cold and chaotic teaching behaviour. In general, this factor structure aligns with the proposals of Skinner and Edge (2002) and corresponds to previous research observing dimensions of the social environment in education settings (Reeve et al., 2004), supporting the content and construct validity of the measure. Evidence for the convergence between observed features of the environment and students' perceptions of the teaching environment have been provided, which supports the initial validity of the measure and suggests that the system is measuring

what is intended. Specifically, multi-level analyses demonstrated that observed autonomy support was related to students' perceptions of autonomy support (β = 0.12) and observed relatedness support was positively related to perceived relatedness support (β = 0.12) and structure (β = 0.11) providing evidence for the criterion-related validity of the measure. However, Haerens et al., (2013) acknowledge that these relationships are relatively modest. In the future it will be interesting to examine in more depth the reason for these marginal relationships, which could be related to the different methodological approaches used to assess actual and perceived teacher behaviour. For example, the observed modest relationships might be a result of a context by measurement confound (Lorenz et al., 2007), where associations are being made between situational teacher observations and more contextual perceptions reported by the students. However, more convincing relationships were found in a follow-up study between observed controlling behaviour, students' perceptions of control and controlled motivation. This aligns with previous research in sport that suggests athletes are more aware of punitive type of coaching behaviour (Curtis et al., 1979) as well as numerous research findings that suggest individuals more closely monitor and are aware of negative types of feedback (Coleman, Jussim, & Abraham, 1987; Gottman & Krokoff, 1989; Graziano, Brothen, & Berscheid, 1980).

Although representing an innovative and theoretically grounded contribution to the literature, there are several potential limitations of Haerens et al's observational instrument, which are important to note. Firstly, inter-rater reliability was reported to be poor for the relatedness supportive (ICC = 0.06) dimension of the measure and relatively low for structure during the learning activity (ICC = 0.49). This might explain the relatively small relationships found between observed and perceived dimensions of the environment and implies that the present results of Haerens et al., (2013) should be interpreted with caution. A second point is related to the rating scale used to assess each of the motivational strategies. After each five-

minute time period, observers are asked to rate each strategy according to a four-point scale anchored at 0, never observed; 1, sometimes observed; 2, often observed; 3, observed all the time. According to these anchor points, for a teacher to score high on autonomy support, and the associated strategies such as "provides explanations and offers choice", they would have to display these strategies 'all the time'. This type of descriptor might not best represent how a motivational environment is created and manifested. For example, the successful and highly regarded basketball coach John Wooden was observed to spend a considerable amount of time in silence throughout his training sessions (Tharp & Gallimore, 1976), and therefore using this measurement system would be unlikely to result in a high overall score on any of the dimensions.

Summarising the Validity and Reliability of Existing Observational Measures

Overall, there are a number of key limitations common to the observational research that has been conducted in sport and PE settings to date. Firstly, only a few studies have made attempts to examine and provide information on the construct and criterion-related validity of the observational systems used. For observational systems to prove useful in future AGT and SDT-based studies, it is important that data collected from these systems can be used to predict key processes inherent to AGT and SDT such as athletes' psychological need satisfaction, motivation and adaptive and maladaptive responses to sport. Secondly, the existing observational systems have tended to be limited in the rating approach used. The majority of observational systems adopt a frequency-type rating approach. This type of recording procedure assumes that higher frequency of behaviour equates to greater quality (or more potently emphasised) environment. It is possible that this type of approach fails to accurately tap into the psychological meaning of the coaching environment, which can be used to understand and explain athletes' motivational responses. A third and final point, and perhaps most pertinent to the present research, is that the available observation systems target

dimensions of the environment relevant to either AGT or SDT. There are currently no observational measures that integrate the key dimensions of the coaching environment relevant to both theories. Developing such a measure would allow researchers to examine and rate the environmental dimensions and higher order factors that constitute an empowering and disempowering motivational coaching environment as proposed by Duda (2013).

Impetus for the Research Program Comprising this Thesis

Grounded in Duda's (2013) recent integration of concepts and tenets embedded in AGT and SDT, this thesis comprises a series of studies aimed at developing a valid and reliable observation system to assess the coach-created motivational climate in sport based on Duda's integrated framework. Overall the set of studies aimed to move beyond typical procedures for establishing the validity of sport-based observation systems (e.g., Brewer & Jones, 2002) and provide evidence for the reliability, construct, criterion-related, predictive and discriminant validity of the newly developed measure. Data were collected from coaches and athletes at the grassroots and elite level, in different contexts (i.e., training and matches), as well as from different cultures (i.e., England, France, Greece and Spain). The overall aim was to address a gap in the motivation-based observation literature (Duda, 2001; Duda & Balaguer, 2007) and overcome the limitations associated with previous observational systems to provide a motivation-based coach observation system that could be used to extend and begin to integrate AGT *and* SDT-based research in sport.

The study conducted in Chapter 2 addressed the need to develop a new observation system assessing features of the motivational coaching environment relevant to both AGT and SDT and grounded in Duda's (2013) integrated conceptualization of the environment. Although initial attempts have been made to observe task- and ego-involving (Boyce et al., 2009) and autonomy-supportive (Webster et al., 2013) features of the motivational environment, these measures were not without their limitations. Most notably, existing

measures focused on only a few particular features of the motivational environment and do not provide an assessment of the multidimensional features of the environment relevant to AGT and SDT. Furthermore, none of the observational measures available capture the higher order constructs of empowering and disempowering environment recently described by Duda (2013). Hence, the purpose of the study conducted in Chapter 2 was to describe the development and validation of the 'Multidimensional Motivational Climate Observation System' (MMCOS), which integrated dimensions of the coaching environment associated with both AGT *and* SDT. A key process in developing a new measurement system is to establish the content validity of the measure. In Chapter 2 this was done by examining the face validity of the measure, which relates to whether the scale measures what it purports to measure. Face validity was established by conducting a comprehensive review of previous AGT and SDT-based self-report and observational measures before sharing the measure with an expert panel of researchers.

The second aims of the studies conducted in Chapter 2 were to examine the cross-country reliability and construct validity of the MMCOS. A coder-training package was developed and materials were back translated into French and Greek. Following translation, coders from England, France and Greece rated English, French and Greek footage respectively. Intra-rater reliability was established before then examining the inter-rater reliability of the individual dimensions of the MMCOS when rated by coders from the three different countries. Following reliability checks, the construct validity of the MMCOS was examined. Based on recommendations by Hoyle and Smith (1994), the factorial validity of the MMCOS was tested and used to provide information on the construct validity of the measure. Based on the strong theoretical underpinnings (Williams, 1995) of the measure, a confirmatory factor analysis (CFA) was conducted adopting a consistent partial least squares

approach (Djikstra, 2010). It is argued that evidence of factorial validity is required before criterion-related or predictive validity can be established (DeVellis, 1991).

Following the CFA, a third and final aim was to test the criterion-related validity of the measure by examining the relationship between the different environmental dimensions and athletes' psychological need satisfaction. This is known as predictive validity and is evidenced by correlations between the scales or measure being developed and an additional measure that the scale is expected to predict (Brown, 1996).

Building on Chapter 2 and addressing a number of important issues related to AGT and SDT research (Keegan et al., 2011; Ntoumanis, 2012), the study conducted in Chapter 3 examined the relationship between multiple perspectives of the coach-created environment and athlete motivation in a culturally diverse sample including athletes and coaches from England, France, Greece and Spain. The first part of Chapter 3 examined the strength and significance of the relationship between athlete, coach and observer reports of the same multi-dimensional coaching environment. This provides evidence for the criterion-related or concurrent validity of the MMCOS, where different measures assessing the same construct are administered at the same time.

A secondary aim of Chapter 3 was to compare the relationship between different perspectives of the environment and athletes' motivation regulations before testing whether the more complex assessment (i.e., all three perspectives together), versus athletes' perceptions only, resulted in a better model fit as well as whether the predictors added to the model remained significant. Overall, findings from this study provide further information on criterion-related validity of the MMCOS, have implications for how the motivational environment is assessed and could reduce reliance on athletes' self-reports. Moreover, the research described in Chapter 3 addresses the issue of common method variance sometimes attributed to AGT and SDT-based research.

Chapter 4 aimed to develop understanding of the motivational environment created by coaches in different contexts. One limitation of previous AGT and SDT research (and corresponding self report questionnaires) on the coaching environment is the lack of separation between what coaches do in training in contrast to matches. The limited research conducted to date suggests that coaches would create a more disempowering environment in matches compared to training, likely due to feelings of pressure and the need to satisfy stakeholders such as the club or athletes' parents (Mageau & Vallerand, 2003; Van de pol et al., 2011). Chapter 4 provides information on the specific strategies used by UK-based coaches in the different contexts of training and matches and tests the discriminant validity of the MMCOS (i.e., the extent to which the subscales of the measure diverge in the different settings). In addition, further information is provided on the inter-rater reliability and construct validity of the measure, particularly when used to rate the environment created by coaches in the distinctive setting of competition. Findings from the study conducted in this chapter have implications for how the coach-created motivational environment is assessed in the future. Further, results are informative in terms of the environment created in training and competitive situations and where interventions should be focused to promote more adaptive motivational coaching environments.

The final study in Chapter 5 of this thesis focuses on a sample of coaches working at a more elite level in youth sport. The aim of this final study was to examine the stability of the motivational environment created by elite academy coaches by employing a mixed-method diary study approach. In contrast to the cross-sectional studies in earlier chapters, study 4 provides repeated assessments of the same sample of coaches. Additional evidence for the inter-rater reliability, construct and criterion-related validity is provided by results of Chapter 5. Findings from the final study offer an explanation for why observed and perceived measures of the motivational coaching environment are often unrelated, while also

highlighting the need to train elite coaches to be more reflective and increase the awareness of their behaviour.

Table 1

Observation systems used in sport and physical education settings to assess the motivational environment

Measure Name	Context	Theoretical Perspective	Content of the Measure	Reliability Evidence	Validity Evidence	Research Published
Observational Checklist of the Motivational Climate	Sport	Achievement Goal Theory	5 categories based on TARGET structure (task, authority, recognition/evaluation, grouping, time) 28 yes/no behavioural strategies across the 5 TARGET categories	Inter-observer Intra-observer	Content Criterion-related	Boyce et al., 2009
MPOWER Autonomy Support Observation System	Sport	Self-determination Theory	6 autonomy supportive coaching strategies moves decision making; prompts for questions and feelings; opts to use player idea; withholds information to guide response; empathises with negative affect; rationalises)	Inter-observer Intra-observer	Content	Webster et al., 2013
Physical Education Climate Assessment Instrument	Education	Achievement Goal Theory	6 categories based on TARGET structure (task, authority, recognition, grouping, evaluation, time) 2 statements for each of the 6 categories (12 overall) – 6 task-involving, 6 ego-involving	Inter-observer Intra-observer	Content Sensitivity-to-change Treatment-Utility	Curtner-Smith & Todorovich, 2002 Todorovich & Curtner Smith, 2002; 2003

Computer-based Observational Measure of Target	Education	Achievement Goal Theory	6 categories based on TARGET structure (task, authority, recognition, grouping, evaluation, time)	Inter-observer Intra-observer	Content Sensitivity-to-change Critterion-related	Morgan et al., 2005 Morgan & Kingston, 2010
Qualitative Assessment of the Teacher-Created Social Environment	Education	Self-determination Theory	3 dimensions (autonomy support, interpersonal involvement, structure) 13 bipolar rating scales across the 3 dimensions	Inter-observer Intra-observer	Content Sensitivity-to-change Treatment-utility Criterion-related	Reeve et al., 2004 Edmunds et al., 2008 Jang, Reeve & Deci, 2010 Cheon et al., 2012
Observational Grid of Instructional Type and Nature	Education	Self-determination Theory	8 teaching behaviours (organisational communication, technical/tactical hints, questions asked, praises, encouragements, perspective-taking statements, negative communications, criticisms) 3 behaviours rated on whether they were autonomy supportive, controlling or neutral (organisational communication, technical/tactical hints, questions asked)	Inter-observer Intra-observer	Content Sensitivity-to-change	Sarrazin et al., 2006 Tessier et al., 2008
Observed Need-Supportive and Need-Thwarting Teaching Behaviours	Education	Self-determination Theory	6 environment dimensions (autonomy support, relatedness support, structure, controlling, cold, chaotic) 36 behavioural strategies across the 6 dimensions	Inter-observer Intra-observer	Content Criterion-related Construct	Haerens et al., 2013 De Meyer et al., 2013 Van den Berghe et al., 2013

Overview of participants recruited to Chapters 2 – 5

Chapters 2 and 3 utilised observational and perceptual data collected during the European-based Promoting Adolescent Physical Activity (PAPA) Project. Data in Chapters 4 and 5 were taken from independent UK samples only. All coaches worked within the context of football and with young athletes between the ages of 10 – 14 years old.

In study 1 of Chapter 2, a sample of 6 coaches were recruited and observed, 3 working at a grassroots level and 3 at the elite level. In study 2 of Chapter 2, observational data from 57 coaches (18 coaches were from England, 22 from Greece and 17 from France) collected as part of the PAPA project were used. In study 3 of Chapter 2, observational data from 56 (17 coaches were from England, 22 from Greece and 17 from France) of the coaches recruited in study 2 were utilised, with the addition of data on psychological need satisfaction from 673 athletes (171 athletes were from the UK, 309 from Greece and 193 from France) recruited as part of PAPA.

Chapter 3 also used data from the 56 coaches and 673 athletes recruited in Chapter 2. Additional data from 18 teams recruited to the PAPA project in Spain were also used (18 coaches and 253 athletes). This resulted in a sample of 74 coaches (17 coaches were from England, 22 from Greece, 17 from France and 18 from Spain) and 926 athletes (171 athletes were from the UK, 309 from Greece, 193 from France and 253 from Spain). In Chapter 3 observations of the 74 coaches, were used alongside coaches' and athletes' perceptions of the environment created, as well as athletes' reports on their motivation to play football. .

In Chapter 4, 17 UK- based grassroots football coaches were recruited and observed during both training sessions and matches. Finally, in Chapter 5 a sample of 5 elite coaches working in a professional football academy were recruited and observational and perceptual data from coaches were collected.

CHAPTER 2.

DEVELOPMENT AND VALIDATION OF THE MULTIDIMENSIONAL MOTIVATIONAL CLIMATE OBSERVATION SYSTEM

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Abstract

This article outlines the development and validation of the Multidimensional Motivational Climate Observation System (MMCOS). Drawing from an integration of the dimensions of the social environment emphasized within achievement goal theory and self-determination theory [as assumed within Duda's (2013) conceptualization of 'empowering' and 'disempowering' climates], the MMCOS was developed to enable an objective assessment of the coach-created motivational environment in sport. Study 1 supported the initial validity and reliability of the newly developed observation system. Study 2 further examined the inter-observer reliability and factorial structure of the MMCOS. Study 3 explored the predictive validity of the observational system in relation to athletes' reported basic psychological need satisfaction. Overall, the results of these studies provide preliminary support for the inter- and intra-observer reliability as well as, factorial and predictive validity of the MMCOS. Suggestions for the use of this observational system in future research in sport are provided.

Keywords: observed, coach behaviour, achievement goal theory, self-determination theory, motivational climate, basic needs

Introduction

Sport coaches engage in a variety of behaviours in an attempt to influence the motivation, thoughts and feelings, and performance of their athletes. Two social-cognitive theories of motivation that are well suited to the study of coaching environments and their cognitive, affective and behavioural implications for sport participants are achievement goal theory (AGT), particularly as articulated by Nicholls, (1989) and self-determination theory (SDT) (Deci & Ryan, 2000; 2002). A large body of sport research has applied these two theories independently (Amorose & Anderson-Butcher, 2007; Pensgaard & Roberts, 2000) or pulled from key constructs from both AGT and SDT (Reinboth, Duda & Ntoumanis, 2004) in an attempt to understand under what conditions athletes experience adaptive and maladaptive motivational outcomes.

To date, the majority of research examining the coaching environment drawing from an AGT or SDT perspective, has relied almost exclusively on athletes' self-reported perceptions of the environment (Duda & Balaguer, 2007; Ntoumanis, 2012). However, the development of valid and reliable objective rating systems to assess motivationally relevant (according to AGT and/or SDT) dimensions of the coaching environment has been suggested as an important direction for future research (Duda & Balaguer, 2007). The data garnered from such observational systems could contribute to the development and evaluation of intervention programmes aimed at modifying the motivational environment. In addition, objective measures of the motivational climate may be used to address issues related to common method variance (De Meyer, Tallir, Soenens et al., 2013) and provide information on the validity of results obtained using self-report scales.

A number of different coach observation systems are currently available to researchers interested in assessing objective features of the coaching environment. However, the majority of these measurement systems (such as the Coaching Behavior Assessment

System, Smith, Smoll & Hunt, 1977, and Arizona State University Observation Instrument, Lacy & Darst, 1984) are not grounded in theories of motivation and were designed to classify coach behaviours into quantitative behavioral categories (i.e., instruction, praise, feedback etc.) based on a frequency count of exhibited discrete behaviors. Consequently, these tools do not capture the psychological relevance or potency of the observed coaching environment drawing from AGT or SDT, or indeed any other theoretical framework which focuses on the motivational significance of leader behaviour from a social cognitive perspective. This is a critical limitation because social-cognitive theories such as AGT and SDT maintain that it is not the degree of occurrence of particular coach behaviors that is most important, but the meaning inferred via how, when and why that behaviour is delivered.

While a number of observational systems grounded in AGT and SDT have been developed to assess the motivational environment in education settings (Haerens et al., 2013; Morgan, Sproule, Weigand & Carpenter, 2005), few motivation-based observation have been developed and applied to the sporting context (Webster Wellborn, Hunt et al., 2013). Further to this, there is currently no observational system which centers on objectively assessing the coaching environment from an integrated AGT and SDT lens.

Therefore, the aim of the present paper is to present the development and initial validation of a new multidimensional motivational climate observation system (MMCOS) that addresses these voids in the literature. The MMCOS integrates features of the environment relevant to AGT *and* SDT to assess the psychological meaning, or potency (i.e., the pervasiveness, intensity and expression), of the coach-created environment operating in the sport setting or activity under observation. Before introducing our goals in and reasons for developing and testing the MMCOS, we will firstly briefly introduce the two theories that set the stage for its development.

Achievement goal theory

Achievement goal theory (particularly, as espoused by Nicholls, 1989) is a social-cognitive theory of motivation that explains how and why individuals are motivated whilst engaged in achievement contexts. Within AGT the perceived motivational climate operating in sport settings and created by a significant other (e.g., the coach) is understood to contribute towards athletes' judgements of competence and definitions of subjective success (Ames, 1992, Duda & Balaguer, 2007). According to Ames (1992), the motivational climate is multidimensional, consisting of features that are classified as task-involving (mastery-focused) and ego-involving (performance focused). In a task-involving motivational climate, the coach emphasises self-referenced criteria as gauges of success, such as personal improvement and task-mastery thereby promoting task-referenced perceptions of competence (Duda & Balaguer, 2007; Seifriz, Duda & Chi, 1992). In a strongly ego-involving motivational climate, other-referenced criteria for success, such as demonstrating superior ability and outperforming others are accentuated encouraging more ego-referenced perceptions of competence (Duda & Balaguer, 2007; Seifriz et al., 1992). In sport settings, the perceived motivational climate has generally been assessed using either the original Perceived Motivational Climate in Sport Questionnaire (PMCSQ) (Seifriz et al., 1992) or the hierarchically structured Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) (Newton, Duda & Yin, 2000). The PMCSQ-2 includes six subscales to assess two higher order factors; i.e., task- and ego-involving climates. The three task-involving subscales capture the degree to which the coach encourages cooperative learning, emphasises or recognises effort and improvement, and indicates all athletes are important for the success of the team. In contrast, the three ego-involving subscales tap the extent to which the coach encourages inter- or intra-team rivalry, emphasises or recognises superior or inferior ability and tends to punish athletes' mistakes.

In previous sport research, athletes' perceptions of the extent to which their sport climate is task-involving have been linked to perceptions of competence (Reinboth, Duda & Ntoumanis, 2004) and positive outcomes, such as higher levels of subjective well-being (Standage, Duda & Pensgaard, 2005) and more self-determined forms of motivation (Lopez-Walle, Balaguer, Castillo & Tristan, 2011). Athletes' perceptions of coach ego-involving behaviors have been positively associated with rating one's ability according to other-referenced criteria (Boixados, Cruz, Torregrosa, & Valiente, 2004) as well as negative or maladaptive behavioural, cognitive and emotional responses, such as dropping out of sport (Sarrazin, Vallerand, Guillet, Pelletier & Cury, 2002).

To date, within AGT-grounded research conducted within the physical domain, there has been a limited attempt to observe and rate dimensions of the coaching environment. Moreover, the small number of AGT-based observational studies conducted in sport and physical education settings specifically have focused on assessing the frequency of coaching or teaching behaviours and providing a description of the degree to which the motivational climate is task- and ego-involving (Boyce, Gano-Overway & Campbell, 2009; Morgan, et al., 2005). That is, although grounded in the social cognitive perspective inherent in AGT, the observation rating systems which mark the literature to date do not capture the quality or psychological potency of the motivational climate created by the coach.

Self-determination Theory

According to SDT, the social environment created by an authority figure (e.g., the coach) has the potential to influence an individual's motivation regulations for participating in an activity via the satisfaction or thwarting of the basic psychological needs for autonomy (i.e., to act according to ones interests, needs and preferences), competence (i.e., to experience oneself as effective when interacting with the social or physical environment) and relatedness (i.e., to belong and feel connected to the group) (Deci & Ryan, 2000). In the SDT

literature, traditionally six environmental factors have been shown to hold motivational relevance for basic need satisfaction; autonomy support and control, structure and chaos, and interpersonal involvement and hostility (Reeve, Jang, Carrell, Jeon & Barch, 2004; Skinner & Edge, 2002).

An autonomy-supportive interpersonal style is manifested when a coach acknowledges athletes' interests, perspective and preferences, and encourages athletes to take ownership over their participation (Deci & Ryan, 1987). In their seminal paper, Mageau and Vallerand (2003) identified 7 behavioural strategies that a coach could adopt to create an autonomy supportive environment and an environment, which is low in its controlling features. These include (1) providing meaningful choices; (2) offering rationale; (3) acknowledging feelings and perspective; (4) encouraging initiative; (5) providing non-controlling feedback; (6) avoiding overt control; and (7) minimizing ego-involvement. A controlling interpersonal style is reflected when a coach coerces athletes' behaviour by using controlling and power assertive strategies (Bartholomew, Ntoumanis & Thogersen-Ntoumani, 2010). Bartholomew, Ntoumanis, Thogersen-Ntoumani (2009) identified 6 strategies that are hypothesised to represent a controlling coach interpersonal style; (1) tangible rewards; (2) controlling feedback; (3) excessive personal control; (4) intimidation behaviours; (5) promoting ego-involvement; and (6) conditional regard.

In their recent research centered on the physical education context, Haerens, Aelterman, Van den Berghe, et al., (2013) identified a relatedness supportive environment as having particular features including interpersonal involvement, which reflect how dedicated a significant other (such as the PE teacher) is to his/her students. According to Haerens and colleagues, a relatedness supportive environment is created when the significant other in question takes an interest in and is knowledgeable about his or her students (or athletes) and contribute to their feeling valued in the setting at hand (Mageau & Vallerand, 2003; Reinboth

et al., 2004). Relatedness supportive environments encourage feelings of care, acceptance, inclusion, trust and respect, and this is communicated in a warm, positive, consistent and non-contingent manner (Fry & Gano-Overway, 2010; Sarason, Sarason & Pierce, 1990). In contrast, when a teacher (or coach) is hostile[1] (i.e., relatedness thwarting), he or she will create an environment that is characterised by behaviours that actively thwart students'/athletes' feelings of relatedness. A relatedness-thwarting environment is characterized as cold, critical and marked by acceptance being contingent upon desirable behaviour(s).

Finally, the environmental dimension of structure refers to the instructions, organisation and guidance provided by the significant other (e.g., the coach) that informs his or her athletes about how to achieve success and meet the objectives of the activity at hand (Skinner & Belmont, 1993). A structured interpersonal style is characterised by the coach providing athletes with instructions and organisation, guidance throughout the learning process, and expectations for their learning (Jang, Reeve & Deci 2010; Skinner & Edge, 2002). In contrast, according to Skinner and Edge (2002), a chaotic environment is confusing and lacking direction and prevents individuals from being effective, stops people understanding what to do and how to do it, and results in non-desirable outcomes.

To date there is considerable evidence supporting the positive relationship between autonomy support from coaches and athletes' basic psychological need satisfaction (Adie, Duda & Ntoumanis, 2008), persistence (Pelletier, Fortier, Vallerand & Briere, 2001) and enjoyment of the sport experience (Alvarez, Balaguer, Castillo & Duda, 2009). The role of structure has garnered most attention in classroom settings (Jang et al. 2010), and has only

[1] For clarity and precision, from this point forward we will refer to the hostile dimension of the coach-created social environment as relatedness thwarting.

recently been studied in the sport domain (Curran, Hill & Niemiec, 2013). Within classroom settings, structure has been positively associated with self-regulated learning under conditions of moderate to high autonomy support (Sierens, Vansteenkiste Goossens, Soenens & Dochy, 2009). Socially supportive (i.e., relatedness supportive) coaching environments have emerged as positive predictors of relatedness need satisfaction (Reinboth et al., 2004) and more self-determined forms of motivation (Pelletier, Tuson, Fortier, Vallerand, Briere & Blais, 1995),

Recent examinations into the 'darker side' of coaching provide evidence for the potential negative impact of critical, coercive, and controlling interpersonal coaching styles. Research conducted by Bartholomew, Ntoumanis, Ryan and Thogersen-Ntoumani (2011) demonstrated a link between controlling interpersonal styles and the active thwarting of the basic psychological needs for autonomy, competence and relatedness, which in turn, predicted negative affect and increased physical symptoms (Bartholomew et al. 2011). The interdependencies between controlling coach environments, need thwarting, and undesirable outcomes (such as burnout) have also been supported in other sport research (Balaguer, González, Fabra, Castillo, Mercé & Duda, 2012). An important implication of these studies is that they indicate that coaches could emphasise both autonomy supportive and controlling criteria in a particular social context, and that these dimensions of the environment are likely to be inversely related but are not necessarily bipolar.

Relationships between relatedness thwarting, chaotic coaching, and different psychological outcomes in sport, including psychological need satisfaction, are yet to be explored. However, it is reasonable to predict that environments that are cold, critical (and, thus, can serve to undermine athletes' healthy and constructive relationships with the coach), as well as being confusing and lacking direction, are likely to be maladaptive. We would expect relatedness thwarting and chaotic coaching environments to be unlikely to foster and

more likely diminish autonomous motivation and to correspond with more negative responses to sport.

Although making important contributions to the literature, a few potential shortcomings could be identified in terms of the existent sport and education-focused SDT-grounded observation systems. Recent sport based research by Webster et al., (2013) focused exclusively on autonomy supportive feature of the coaching environment and no attempt was made to rate other key features of the social environment emphasized in SDT. Within education settings, the rating scale employed by Reeve et al., (2004) situates dimensions of the teaching environment on a bi-polar continuum (e.g., autonomy supportive and controlling placed as opposite ends on the same scale). In a recent extension Haerens et al., (2013) have developed and provided initial validation for a system that can be used to observe need supportive and need-thwarting features of the PE environment. Although the measure has demonstrated a degree of predictive validity, the frequency style rating scale and anchor descriptions (e.g., 0 – never observed; 3 – observed all of the time) could be questioned. For a teacher to achieve a high score on any of the behavioural categories, they would have to engage in the behaviour 'all of the time'. This quantity style rating does not consider the quality (and overall meaning) of the exhibited behaviors, which has been addressed and encapsulated within the definition of potency used in the MMCOS.

The Multidimensional Motivational Coaching Environment

Based on the tenets of SDT, AGT and a plethora of related evidence, it has been proposed that more adaptive environments would be characterized as highly autonomy supportive, relatedness supportive and task-involving. A motivational climate that is high in these characteristics has been conceptualised by Duda (2013) as being more *empowering*. Duda argues that more empowering sport environments are more likely to satisfy athletes' autonomy, relatedness and encourage task-referenced perceptions of competence. In contrast,

she has suggested that environments marked by controlling, relatedness compromising and ego-involving coach behaviors could be classified as more *disempowering* (Duda, 2013). Disempowering motivational climates are assumed to contribute to low need satisfaction and indeed, even the thwarting of the basic psychological needs of autonomy, relatedness and competence, and/or encourage other-referenced conceptions of competence. Past research that has examined the coaching environment in terms of AGT and SDT-grounded dimensions (e.g., Reinboth et al., 2004). Reinboth et al., (2004) has found that autonomy supportive, task-involving and socially supportive features of the coaching environment predict autonomy, competence and relatedness need satisfaction, respectively. A study in vocational dance settings showed that dimensions of the social environment considered from an AGT and SDT perspective accounted for unique variance in dancers' basic psychological need satisfaction (Quested & Duda, 2010). Aligned with Duda's (2013) multi-dimensional integration of facets of the social environment emphasized by AGT and SDT, and the theoretical assumptions and evidence outlined previously, we developed the Multidimensional Motivational Climate Observation System (MMCOS) to capture 7 motivationally relevant aspects of the social environment including autonomy support, relatedness support, task-involving, controlling, relatedness thwarting, ego-involving and structure.

Present Studies

The purpose of the present set of studies was to develop and test an observational system to assess the multidimensional coach-created motivational climate in sport which is grounded in the AGT and SDT. Yoder and Symons (2010) identify a number of fundamental processes for developing an observational measurement system. In general, the validation procedures described by Yoder and Symons (2010) mirror the validation procedures relevant to the development of self-report measures in sport and exercise psychology measurement.

Within the present set of studies, the content (study 1), construct (study 2) and criterion-related (study 3) validity of the MMCOS is examined.

After describing the development of the MMCOS, the initial reliability and validity of the observational rating system is examined in Study 1. Coders in 3 European countries were asked to rate footage of coaches in action. It was hypothesised that there would be no differences in ratings across this sample of coders and that an acceptable degree of both inter- and intra-observer reliability would be evident.

The second study further assessed the reliability of the MMCOS when utilised by a group of independent coders (i.e., observers who were not involved in the initial development of the measure). The factor structure of the measure was also examined. Following coder training, it was expected that coders be able to observe and code to an acceptable degree of reliability. According to the theoretical underpinnings, it was expected that dimensions of the motivational environment included in the MMCOS would load onto two higher order factors, empowering and disempowering.

The third and final study tested the predictive validity of the MMCOS in relation to athletes' reported basic psychological need satisfaction. Drawing from research employing self-report measures of the coach-created environment, we predicted that autonomy supportive, task-involving, relatedness supportive and structured features of the environment would be positively related to one or more of the basic psychological needs (e.g., Quested & Duda, 2010; Reinboth, et al., 2004). It was expected that controlling, ego-involving and relatedness thwarting features of the environment would be negatively related to one or more of the basic psychological needs. Similar to previous research examining the associations between observation-based variables and self-reported constructs (e.g., Haerens et al., 2013). we expected the relationships to be relatively small but nonetheless significant

Study 1

Study 1 aimed to (a) examine the initial validity of the MMCOS, and (b) to provide evidence for the inter-observer and intra-observer reliability of this measurement system.

Method

Participants

Six male grassroots football coaches from football clubs in England were recorded during a regular training session. Coaches led teams of athletes between the ages of 9 and 14. Three of the teams participated at a grassroots level and 3 of the teams were part of a centre of excellence at a professional football club. By filming coaches at different competitive levels, we expected to observe a diverse range of coaching environments (i.e., there should be variability in the types of coaching strategies employed). Coaches and athletes provided informed consent to take part in this study.

Procedure

On the day of filming, a researcher arrived at the training pitch at least 5 minutes prior to the scheduled start time. At this juncture, a small clip-on microphone and voice recorder were attached to the coach. Following this, the researcher positioned himself/herself away from the training pitch in a non-obtrusive location and recorded the rest of the session until all of the athletes had finished training and departed from the area. In an attempt to guard against a possible Hawthorne effect (Adair, Sharp & Huynh, 1989), the researcher had visited the coach while he/she was delivering training sessions prior to the day of filming. This ensured that coaches and players were more familiar with a researcher being present at the training. In addition, previous research suggests that coaches are relatively unaware of the environment they create (Curtis, Smith & Smoll, 1979) and as well, potentially what is desirable and undesirable behaviours. Therefore the degree of social desirability-based behaviour change exhibited by the coach was expected to be minimal.

Following filming, seven 5 minute clips were selected from the 6 training sessions videotaped (20% of total footage) and sent to the lead researchers in both Greece and France. Clips were purposefully selected to ensure that the sample varied in behavioural content (from the standpoint of our theoretical lens; Duda, 2013). The three researchers were all educated to postgraduate level or above in the discipline of sport psychology, had a good knowledge of AGT and SDT, were fluent in English and had experience of playing and coaching soccer.

All 3 researchers coded, in English language, the seven 5-minute blocks of active footage rating the coach against the dimensions included in MMCOS. For each clip, the coders were asked to provide a potency rating for each of the environmental dimensions and higher order factors on the following scale; 0 (not at all), 1 (weak potency), 2 (moderate potency), 3 (strong potency). After an elapsed time period of at least 7 days, the same clips were re-coded following the same procedure. In total, each coder made 140 assessments during the 2 rating sessions. Following data analysis the coders and expert research panel met to discuss issues related to the measurement system.

Measures

Multidimensional Motivational Climate Observation System (MMCOS) The MMCOS was developed to allow observers to differentiate and code the potency of different features of the coach-created motivational climate which are endemic to AGT and SDT. The MMCOS is organised in a hierarchical structure whereby observers code the coaching environment according to 2 higher order factors; empowering and disempowering, 7 environmental dimensions (autonomy support; controlling; task-involving; ego-involving; relatedness support; relatedness thwarting; structure) and 32 lower-order coach behavioural strategies identified within AGT and SDT-based sport research. The complete measure can be found in the appendix.

An iterative process was followed to develop the MMCOS. Initially a comprehensive literature search was conducted to identify dimensions of the environment and behavioural strategies captured within the AGT and SDT-based literatures (Bartholomew et al., 2009; Mageau & Vallerand, 2003; Newton et al., 2000). After developing an initial version of the observation system, which included 8 dimensions and 27 behavioral strategies, an expert panel of 5 researchers (with expertise in sport and motivation psychology), who were involved in the European-wide PAPA project (Duda, Quested, Haug et al, 2013), evaluated the face validity of the measure and commented on the applicability of types of rating procedure that could be used.

Following these discussions, 5 additional strategies were included within the measure (3 within the relatedness support and 2 within the relatedness thwart dimension) and refinements were made to several definitions utilised in the observational rating system. For example 'provides rationale' was changed to 'provides rationale for drills/activities/exercises'. In addition, a potency rating was developed to capture the psychological meaning of the different environmental dimensions. The potency rating takes into account the frequency of observed coaching strategies, but, importantly also considers the intensity or quality of the coach's delivery and how pervasive the environment was in terms of its motivational 'meaning.' After a follow-up meeting, a marking scheme and coder training booklet were devised to enable the coders to have the relevant details to utilize the measure and increase likelihood that they would make reliable ratings (available on request from first author).

The MMCOS is designed to rate a specific time period of footage of coaches in action. At the end of each specified time-period (e.g., 5 minute intervals, quarters of a particular training period), the 7 dimensions of the environment are coded on a 4-point potency scale, ranging from 0 (not at all) to 1 (weak potency), to 2 (moderate potency), and

to 3 (strong potency). To aid coders in making their rating they are given a marking scheme, which includes anchor descriptions for the potency rating scale, as well as a list of 32 behavioral strategies that are believed to be differentially indicative of each of the environmental dimensions. Whilst observing, coders are asked to identify the presence of the lower order behavioral strategies (via a checkmark), which are then used to inform their potency rating at the end of that block of time. For example, a coach can emphasize autonomy support by 'providing meaningful choices'; be controlling by 'using extrinsic rewards'; be task-involving by 'recognizing effort and improvement'; be ego-involving by 'emphasizing inferior or superior ability'; be relatedness supportive by 'adopting a warm communication style'; be relatedness thwarting by 'showing a lack of care and concern for players', and, finally, emphasize structure by 'providing guidance throughout exercises'. A full list of the behavioral strategies can be seen in the appendix. On completion of the entire training session observed, coders are then asked to rate the extent to which the coach was 'empowering' (i.e., supports the basic needs for autonomy, relatedness and encourages task-referenced perceptions of competence) as well as 'disempowering' (i.e., thwarts the basic needs for autonomy, relatedness and encourages ego-referenced perceptions of competence) using the same 0 to 3 potency scale (Duda, 2013).

Translation Procedure

To produce French and Greek versions of the observation instrument respectively, standardized back-translation techniques (Brislin, 1986; Duda & Hayashi, 1998) were used. First, a bilingual interpreter translated the English version of the systematic observation instrument into French and Greek, and then 2 independent bilingual interpreters translated the same instrument back into English. The original English version was then compared with the back-translated version and errors and discrepancies were identified. The back-translation comparison process was repeated until all discrepancies were eliminated. The final version

exhibited no contradictions with the original English version of the measures when back-translated.

Data Analysis

To determine the initial validity and reliability of the measurement system Pearson's correlations, Analysis of Variance (ANOVA) and t-tests were conducted to examine the relationships and mean differences between ratings made by the lead researchers in the England, Greece and France. Following this, the inter-observer and intra-observer agreement (reliability) of the 3 coders' ratings were examined using a two-way random intra-class correlation coefficient (ICC) as used in previous observation-based research (Haerens et al., 2013; Van den Berghe et al., 2013). Intra-class correlation coefficients are interpreted as poor if the value falls below 0.50, moderate if the value is between 0.50 and 0.75, and good if it is above 0.75 (Portney & Watkins, 2009).

Results and Discussion

Ratings made by observers from England, France and Greece at both the environmental (range r = .0.74 - 0.77, all $p < 0.001$) and higher order factor level (range 0.81 – 0.93, all p <0 .001) were strongly positively correlated. Results from the ANOVA indicate that there were no significant differences in ratings made by the coders from each county [$F(2, 165) = 0.41$, $p = 0.663$]. Follow up t-tests demonstrated there were no significant differences in ratings of the environmental dimensions made by observers from England (M = 0.91, SE = 0.12) and France (M = 1.09, SE = 0.15) $t(55) = -1.87$, $p = 0.067$, England and Greece (M = 0.91, SE = 0.12) $t(55) = 0.00$, $p = 1.00$, and France and Greece $t(55) = 1.80$, p = 0.077. Similarly, at the higher order level there were no significant differences in ratings of empowering and disempowering made by observers from England (M = 1.07, SE = 0.25) and France (M = 1.14, SE = 0.33) $t(13) = -0.37$, $p = 0.72$, England and Greece (M = 093, SE = 0.27) $t(13) = 1.47$, $p = 0.165$, and France and Greece $t(13) = 1.39$, $p = 0.189$.

Data presented in tables 1 and 2 suggest observers' ratings reflected an adequate degree of reliability. At the level of the social environmental dimensions, results suggest a good to very good degree of inter-observer (*M* ICC = 0.74) and intra-observer reliability (*M* ICC = 0.87). A good to very good level of inter-observer (*M* ICC = 0.86) and intra-observer (*M* ICC = 0.93) reliability was also witnessed at the higher order factor level (i.e., empowering and disempowering).

Table 1

Inter-observer reliability for the higher order factors and environmental dimensions across countries

	Higher Order Factors	Environmental Dimension
Raters	ICC	ICC
England*France	0.77	0.74
England*Greece	0.93	0.74
France*Greece	0.87	0.73
Average	0.86	0.74

Note: N Coaches = 6. ICC < 0.50 = poor, > 0.50 < 0.75 = moderate, > 0.75 = good

Table 2

Intra-observer reliability for the higher order factors and environmental dimensions

	Higher Order Factors	Environmental Dimension
Raters	ICC	ICC
England	0.92	0.87
France	0.87	0.82
Greece	1.00	0.91

Average	0.93	0.87

Note: N Coaches = 6. ICC < 0.50 = poor, > 0.50 < 0.75 = moderate, > 0.75 = good

Whilst the results from Study 1 provide initial evidence for the validity of the measurement system and the rating process yielded a good degree of inter- and intra-observer reliability, a number of issues were identified during the observations and these were discussed during a follow up meeting involving 5 researchers experienced in AGT and SDT based research. A key consideration revolved around the initial inclusion of chaos as one of the 'disempowering' environmental dimensions. Chaos has scarcely been addressed in the motivational climate literature, and although researchers consider it to be the opposite of structure (Jang et al. 2010; Skinner & Belmont, 1993; Skinner & Edge, 2002). In their recent study on observed need thwarting behaviours in PE, van den Berghe et al., (2013) rated 'chaos' and reported a minimal score of 0.08 out of a possible score of 3. It is possible that chaos is exhibited when a coach exhibits few if any observed structure-related behaviours or actions. This is consonant with how chaos is described in the literature; i.e., it is a result of low levels of structure or a laissez-fair type of environment (Jang et al., 2010). It is also possible that chaos is noted more in terms of athletes' behaviour and could be an outcome of low levels of structure.

Perhaps because of such issues, in the present work, we found it difficult to assign a rating to chaos as a separate dimension from structure on the 0 to 3 potency scale.. Consequently, it was decided that the chaos dimension be removed from the MMCOS, and the structure dimension be adapted and refined to enable a more reliable rating of a weak, moderate and strongly structured environment. During the coder training process, it was also emphasized that structure is likely to provide a foundation for the other behavioural dimensions to be communicated (i.e., structure can be delivered in an autonomy supportive or

controlling, task- or ego-involving way). This proposition has recently been examined by researchers examining the relationship between autonomy support and structure in both education (Jang et al. 2010) and sports (Curran et al. 2013) contexts.

Finally, based on the results stemming from Study 1, it was decided that a detailed marking scheme needed to be produced to enable observers to identify the different levels of potency to be recorded using the 0 – 3 potency scale. It was assumed that this would support observers in making more reliable and consistent decisions regarding the potency of the observed environment.

Study 2

Study 2 aimed to (a) provide further evidence for the reliability of the MMCOS within a sample of independent observers, and (b) to examine the factorial composition of the dimensions included in the MMCOS via partial least squares (PLs) confirmatory factor analysis (CFA).

Method

Participants

Coaches were recruited from within the European-based Promoting Adolescent Physical Activity (PAPA) Project (Duda, 2013). Each of the youth sport coaches provided informed consent to be filmed during a training session. The 57 (*N* England = 18; *N* Greece = 22; *N* France = 17) coaches (55 male; 2 female) had a mean age of 37.6 years (*SD* = 9.9 years), coached male teams aged between U10's – U14's, and had been coaching football for 7.1 years.

Procedure

The same filming protocol presented in study 1 was followed. After the videotape/auditory recordings were obtained, 9 coders (3 from UK, 3 from Greece and 3 from France) received approximately 6 hours of coder training (see details below for the

coder training process). All coders were educated to post-graduate level or above in the discipline of psychology and had good knowledge of the theories underpinning the measure, as well as experience of being coached or coaching in the targeted sport of soccer.

Following coder training, observers were asked to code the 57 videos of the grassroots coaches in training sessions using the version of the MMCOS revised after study 1. Two coders were selected to rate video footage from their own country (i.e., French coders rated French footage). Videos were split into 4 equal quarters. This allowed different length training sessions to be compared in parallel and ensured that all of the observed training session was considered when making a rating of the environment. To code the video footage, observers used the recording sheet and the newly developed marking scheme. The marking scheme takes into account the type and variety of behavioural strategies adopted by the coach, the intensity and expression of these strategies (i.e., the potency), as well as who they are directed at (e.g., individuals/small groups/whole team). This helps inform the observers rating on the aforementioned scale. At the end of each quarter, observers were instructed to rate the potency of the observed coaching environment according to the 7 environmental dimensions, using the scale 0 (not at all potent) to 3 (strong potency). After viewing the entire coaching session, the observers also provided an overall rating of the extent to which the environment was empowering and disempowering using the same scale.

Coder Training

Training consisted of PowerPoint presentations, small group seminars and collaborative and independent coding sessions, and took approximately 6 hours to complete. To finish their coder training, coders were asked to rate 2 pilot videos using the MMCOS. These ratings were compared with a ‘gold standard’ rating from the lead researcher. If the ICC coefficient surpassed an acceptable level of reliability (i.e., ICC > 0.70) coders began

rating the main trial footage. The content of the coder training is available from the first author upon request.

Data Analysis

Similar to study 1, inter-observer reliability was examined using a two-way random ICC and interpreted alongside the cut-points proposed by Portney and Watkins (2009). In this study the reliability of the MMCOS was explored in more depth by examining ratings according to the coders' country as well as the specific dimensions of the measure.

To examine the factor structure of the MMCOS and test our hypothesized models, we adopted a consistent partial least squares approach (PLSc) (Dijkstra & Schermelleh-Engel, 2013). Conventional partial least squares (PLS) analyses tend to result in biased estimates, and typically lead to overestimated factor loadings and underestimated factor intercorrelations (Dijkstra, 2010). Dijkstra and colleagues (Dijkstra, 2014; Dijkstra & Schermelleh-Engel, 2013) developed a series of corrections that can be applied to conventional PLS estimates resulting in more accurate parameter values when applied to the population. To conduct the PLSc analysis we used specialized software named SmartPLS 2.0 (Ringle, Wende & Becker, 2014).

To begin, an average of the 2 observers' ratings per quarter (i.e., for quarter 1, 2, 3 and 4) were calculated for the 7 environment dimensions, before then computing an aggregated dimension score (see Table 4 for means and standard deviations). Following this, we tested our initial hypothesized model (model 1)[2]. The first step was to examine the hypothesized structure of a model in which the autonomy support, task-involving, relatedness supportive and structured dimensions loaded onto the 'empowering' factor and controlling, relatedness thwarting and ego-involving dimensions loaded onto the 'disempowering' factor.

[2] Based on reviewer comments, an additional model was tested loading the ego-involving dimension onto the empowering factor. The ego-involving dimension did not significantly load onto the empowering factor and the model demonstrated a poorer fit overall than the tested models.

Model fit was evaluated using a number of indices of convergent and discriminant validity. Convergent validity is considered acceptable when the composite score reliability of each dimension is higher than 0.70, the average variance extracted (AVE) for each factor is higher than 0.50. Discriminant validity is supported when the factor loadings of an item on its own construct is higher than its cross loadings on the other constructs and the square root of the AVE of any construct was higher than its correlation with other constructs.

A bootstrapping resampling technique with 500 replications was applied to the corrected PLSc estimates and used to reveal reliable averaged path estimates and associated significance levels. Bootstrapping technique produces t-statistics to determine whether the standardized regression weights are statistically significant (values above 1.96 are significant in .05 level and values above 2.32 are significant in .01 level).

Results and Discussion

The reliability values presented in table 3 suggest that overall the observers England, France and Greece rated the environment with a moderate to good degree of reliability. In England, ICC values for Autonomy Support (ICC = 0.82), Task-involving (ICC = 0.70), Ego-involving (ICC = 0.74), Relatedness Supportive (ICC = 0.70) and Structured (ICC = 0.73), facets of the environment, and in France, the ratings for Ego-involving (ICC = 0.63) were considered to be moderate. The remaining ICC’s from the three different countries surpassed 0.75 and were interpreted as good (see table 3).

Table 3

Reliability of English, French and Greek observers' ratings for the environmental dimensions and higher order factors

		Inter-observer agreement (ICC)				Internal consistency (α)
		England (N = 18)	France (N = 17)	Greece (N = 22)	Average (N = 57)	
Environmental Dimensions	Autonomy Support	.82	.92	.96	.90	.72
	Controlling	.89	.95	.97	.94	.66
	Task-involving	.70	.82	.89	.80	.75
	Ego-involving	.74	.63	.97	.78	.64
	Relatedness Supportive	.70	.92	.89	.84	.56
	Relatedness Thwarting	.86	.85	.97	.89	.62
	Structured	.73	.87	.90	.83	.81
Higher Order Factors	Empowering	.91	.97	.94	.94	-
	Disempowering	.82	.94	.98	.91	-

Note: ICC = Intra-class Correlation Coefficient

Results from the PLSc factor analysis are presented in Tables 4 and provide information on the discriminant and convergent validity of the tested models. Model 1 demonstrated a poor fit to the data. Convergent validity was not achieved and the AVE for the disempowering factor was below the acceptable cut point of 0.50. Further evidence for poor fit and lack of convergent validity associated with the disempowering factor in model 1 is provided by the low composite reliability (0.39). Based on the discriminant validity information presented in table 4, we can see that both the controlling and ego-involving dimensions failed to load significantly on the disempowering factor. In contrast, the empowering factor performed well and demonstrated a good degree of convergent and discriminant validity, with the 4 dimensions loading significantly onto the specified construct.

Table 4

Indices of discriminant validity, including item loading, cross loading and correlations from cPLS confirmatory factor analysis

Observed Dimensions	*M* (SD)	Model 1		Model 2		Model 3	
		Emp	Disemp	Emp	Disemp	Emp	Disemp
AS	0.86 (0.63)	0.73 (2.41)	-	0.76 (2.36)	-	0.69 (4.02)	-
TI	1.56 (0.56)	0.87 (2.44)	-	0.72 (2.73)	-	0.66 (3.07)	-
RS	1.35 (0.68)	0.99 (2.57)	-	1.11 (2.73)	-	1.01 (7.32)	-
ST	1.78 (0.49)	0.49 (0.06)	-	0.28 (0.54)	-	-	-
CO	1.27 (0.51)	-	0.08 (1.61)	-	0.64 (1.96)	-	0.67 (4.71)
EI	0.50 (0.42)	-	-0.14 (0.99)	-	-	-	-
RT	0.62 (0.54)	-	0.15 (1.34)	-	1.11 (3.77)	-	1.07 (3.68)
Correlation		-3.10		-0.42		-0.47	
AVE		0.63	0.02	0.60	0.82	0.65	0.79
Composite Reliability		0.86	0.00	0.84	0.90	0.84	0.88

Note: N Coaches = 57. Emp = empowering factor, Disemp = disempowering factor. AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting. Values in parentheses reflect t-statistic from bootstrapping – values above 1.96 denote significance at 0.05, values above 2.32 denote significance at 0.01; Evidence for validity when AVE > 0.50, composite reliability > 0.70

In a follow-up analysis, two alternative models (i.e., model 2 & 3) were tested removing the ego-involving dimension in model 2, and removing both the ego-involving and structured environment dimensions in model 3. Therefore, model 2 included autonomy supportive, task-involving, relatedness supportive and structured dimensions loading onto an empowering factor while controlling and relatedness thwarting dimensions assumed to load onto a disempowering factor. In model 3 autonomy supportive, task-involving and relatedness supportive dimensions were identified as loading onto the empowering factor and controlling and relatedness thwarting dimensions were predicted to load onto the disempowering factor. In model 2, both the empowering and disempowering dimensions demonstrated a good fit to the data and showed acceptable convergent and discriminant validity (see table 4). The AVE for both factors surpassed the acceptable level of 0.50, and the composite reliability coefficient was above the specified value of 0.70. Bootstrapping on the estimates produced by the PLSc analyses indicated reliable and significant paths for autonomy supportive, task-involving and relatedness supportive dimensions to the empowering factor, and controlling and relatedness thwarting dimensions to the disempowering factor. The structure dimension did not significantly load onto the empowering factor in model 2 (although the estimate was positive). In the third and final model (without structure), an acceptable degree of convergent and discriminant validity was observed. In addition, all environment dimensions significantly loaded onto the specified empowering or disempowering factors as evidenced by bootstrapping.

In the current sample of youth sport coaches, more heightened or excessive ego-involving behaviors were not observed. This resulted in the observed low potency score and limited variability. It could be also the case that the ego-involving behaviors that the youth football coaches exhibited were not particularly disempowering. However it is important to note that simple correlations revealed the ego involving environmental dimension to

positively correlate with the targeted facets of both an empowering and disempowering climate. Previous research would suggest that over time a highly ego-involving environment would compromise athletes' perceived competence (Duda & Balaguer, 2007) and likely reduce their feelings of autonomy, and thus correspond to negative outcomes. As assessed via the MCCOS, the theoretically assumed negative and disempowering implications of observed ego involving coach behaviors might be more likely to emerge over time. This possibility could be examined in future longitudinal studies.

Study 3

The purpose of study 3 was to examine the predictive validity of the MMCOS in relation to athletes' self-reported basic psychological need satisfaction in football. Need satisfaction was chosen as the criterion variable as this was a central consideration in the development of the MMCOS and aligned with Duda's (2013) conceptualisation of the psychological processes by which 'empowering' and 'disempowering' climates contribute to positive and negative outcomes, respectively. Moreover, need satisfaction was assumed to proximally link to the dimensions of coach behaviour captured within the MMCOS.

Method

Participants

Fifty-six of the coaches recruited to take part in study 2 and their 673 athletes provided consent to take part in study 3. One coach from the 57 included in study 2 was removed as his athletes did not complete the questionnaire pack. On average, the athletes from the 56 remaining teams were aged 11.29 years (SD = 1.50; range 9 – 15), had been with their current team for 3 seasons (M = 2.97, SD = 2.03) and took part in football for approximately 4 hours per week (M = 4.20, SD = 1.84).

Procedure

Video footage was collected following the procedure outlined in study 1. Within two weeks following the filmed session athletes were asked to complete a series of scales regarding their basic psychological need satisfaction in football during the previous 3 to 4 weeks.

Athletes were asked to respond honestly to 15 items using the stem 'during the past 3 – 4 weeks, in this football team'. To assess autonomy need satisfaction, 5 items from the scale used by Standage et al. (2005) were administered (e.g., I decided which activities I practiced). Competence need satisfaction was assessed using the 6 items from the perceived competence subscale of the Intrinsic Motivation Inventory (McAuley, Duncan & Tammen, 1989) (e.g., I thought I was quite good at football). Relatedness need satisfaction was examined using the 4 items from the relatedness subscale developed by Richer and Vallerand (1998) (e.g., I felt people understood me). All answers were reported on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The alpha coefficients for autonomy, competence and relatedness need satisfaction were 0.61, 0.85 and 0.77 respectively.

Data Analysis

To examine the relationship between observed aspects of the coaching environment and athletes' reported need satisfaction multilevel regression analyses were conducted using SPSS version 21.0 (2012). Multilevel analyses were deemed appropriate as athlete data were nested within teams. The model had 2 levels, consisting of 673 athletes at Level 1 and 56 teams (observed sessions) at Level 2. Initially an intercept-only model (Hox, 2010) was used to partition the variance between Level 1 and 2 and evaluate how much of the variation in autonomy, competence and relatedness need satisfaction was situated at the team versus athlete level. Following this, the observed dimensions of the coaching environment as rated by the MMCOS were included as covariates and specified as fixed main effects. All predictor variables were grand mean centred prior to inclusion in the model.

Following the recommendations of Rasbash, et al., (2000) model efficacy was evaluated by comparing the improvement in fit from empty model to model 1. We examined the change in -2 log (reference – deviance) using a Chi-square distribution at k degree of freedom, where k represents the number of predictors (i.e. parameters) added to the model. Chi-square values below $p = 0.05$ indicate a significant improvement in model fit.

Results and Discussion

In the first instance, we examined the between team level variance in perceptions of autonomy, competence and relatedness need satisfaction. For all three of the basic psychological needs, the majority of variance was at the between-athlete level. For autonomy and relatedness, only a small amount of variance (3.74% and 4.76%, respectively), was situated at the between-team level. For competence, variance attributed to the team level was 11.8%. Typically, multi-level analysis is appropriate when more than 5% of the variance is explained by the nesting within teams (Hox, 2010). Although the variances for autonomy and relatedness are slightly below the 5% figure, we preceded with multi-level analysis in order to keep the analysis procedure consistent across the three basic psychological needs.

There was a trend for a significant positive relationship between observed autonomy support and athletes' autonomy need satisfaction (0.12). There was also a trend for structure to positively predict autonomy (0.20). Observed structure also positively predicted both competence (0.36) and relatedness need satisfaction (0.41). With respect to the disempowering features of the environment, observed relatedness thwarting was negatively related to athletes' competence (-0.21) and was close to being significantly and negatively related to relatedness satisfaction (-0.16). The controlling dimension of the environment also negatively predicted athletes' relatedness (-0.25).

Observed task-involving and ego-involving environment dimensions were not associated with satisfaction of the basic psychological needs[3]. Contrary to predictions, observed relatedness support was negatively associated with athletes' autonomy (-0.21) and relatedness need satisfaction (-0.24). This finding could be understood to reflect a suppression effect, whereby the estimate is amplified by the inclusion of additional predictors (Cohen, Cohen, West & Aiken, 2003). In the absence of the other environment dimensions, the relatedness supportive dimension was not significantly related to the basic psychological needs.

Table 5 shows that changes from empty model to model 1 there was a significant reduction in -2 log for competence (24.73) and relatedness need satisfaction (30.99). This indicates an improved fit as a result of the addition of the predictor variables, Change in -2 log from the reference model to deviance model suggest the improvement in fit for autonomy need satisfaction (13.34) was approaching significance ($p < 0.10$).

[3] Based on reviewer comments, structure was removed from the analysis to explore the contribution of autonomy supportive, task-involving and relatedness supportive dimensions. This had little impact on autonomy support and relatedness support. However, for the task-involving dimension, estimates increased from -0.05 and -0.01, to 0.08 and 0.14 for competence and relatedness satisfaction, respectively.

Table 5

Relationship between observed empowering dimensions and athletes' basic psychological need satisfaction

	Basic Psychological Needs		
	Autonomy (*SE*)	Competence (*SE*)	Relatedness (*SE*)
Fixed Part: Observation			
Autonomy Supportive	0.12 (0.07)+	-0.13 (0.08)	-0.03 (0.08)
Task-involving	-0.05 (0.10)	-0.05 (0.11)	-0.01 (0.10)
Relatedness Supportive	-0.21 (0.10)*	-0.08 (0.12)	-0.24 (0.11)*
Structured	0.20 (0.11)+	0.36 (0.12)**	0.41 (0.11)**
Controlling	-0.06 (0.10)	-0.15 (0.11)	-0.25 (0.11)*
Ego-involving	0.09 (0.08)	0.12 (0.09)	0.05 (0.09)
Relatedness Thwarting	-0.07 (0.09)	-0.21 (0.10)*	-0.16 (0.09)+
Random Part: Intercept-Only Model			
Team-level variance	0.02 (0.01)	0.05 (0.02)	0.03 (0.02)

Athlete-level variance	0.44 (0.03)	0.43 (0.03)	0.57 (0.03)
Random Part: Multiple			
Predictor Model			
Team-level variance	0.01 (0.01)	0.03 (0.01)	0.01 (0.01)
Athlete-level variance	0.44 (0.03)	0.42 (0.02)	0.57 (0.03)
Test of Significance			
Reference model	1285.94	1296.82	1462.75
Deviance (-2LL)	1272.60+	1272.09***	1431.76***

Note: N Coach Observations = 56, *N* Athletes = 673. +p < 0.10, *p < 0.05, ** p < 0.01, ***p < 0.001

General Discussion

The purpose of the current research was to present the steps taken to develop and evaluate an observational instrument designed to assess the multidimensional motivational coach-created environment from an integrated AGT and SDT perspective (Duda, 2013). A series of three studies support the initial validity and reliability of the new observational rating system. As a result of this research, the MMCOS allows observers to rate the potency of the coaching environment according to seven environmental dimensions emphasised within AGT and SDT (Duda & Balaguer, 2007; Skinner & Edge, 2002) and two higher order factors of whether the environment in question is more or less 'empowering' and 'disempowering' (Duda, 2013).

Findings of study 1 indicate that at both the environmental (i.e., autonomy supportive, controlling) and higher order factor (i.e., empowering, disempowering) levels, there were no significant differences between the ratings made by the lead researchers in England, France and Greece. In addition, the good degree of reliability at both the higher order and environment dimension levels suggest there was consistency in how the observers interpreted and rated the motivational climate. Overall, these results provide initial evidence for both the validity and reliability of the MMCOS.

An important component in the development of an observational measurement system is the generation of the coder training package (Brewer & Jones, 2002). This has been given considerable attention in previous studies charting the development of new observational instruments (Roberts & Fairclough, 2012). In the present research, it was necessary to train coders to be able to identify the motivational meaning of specific coaching strategies, as well as to have a good understanding of the complexities of both AGT and SDT and to be able to consistently identify 'empowering' and 'disempowering' features of the environment. As a result of the comprehensive training protocol, observers coded the environmental dimensions

(Range .78 - .94) and higher order factors (Range = .91 - .94) to a moderate to substantial degree of reliability. On average, all 7 environment dimensions surpassed the acceptable cut off level of 0.70 identified by Vincent (1999). In England, reliability for the relatedness support dimension was classified as moderate according to an ICC of 0.70. It is possible that relatedness support, in comparison to autonomy or competence support is more subject to interpretation on the part of the coders (Haerens et al., 2013). The relatedness supportive environment dimension includes strategies such as 'shows care and concern for athlete', which may well be viewed differently by different observers (Haerens et al., 2013). It has been suggested that relatedness support might be less overt and possibly more subjective than the strategies associated with an autonomy supportive or controlling motivational environment for example (Bartholomew et al., 2011; Haerens et al., 2013). The ego-involving dimension as rated by French coders was slightly lower with an ICC of 0.63. It is possible that there was some confusion among the French coders on how to identify and code an ego-involving climate, which might explain the slightly lower reliability and weak potency score. Nevertheless, the ICC was approaching the 0.70 value considered acceptable (Vincent, 1999). In future research employing the MMCOS, it may be necessary to provide periodic observer training sessions and allocate additional time to ensure coders can accurately identify all 7 of the environment dimensions.

A second aim of study 2 was to evaluate the factor structure of the MMCOS using consistent partial least squares analysis. In the three tested models, the first identified and supported factor was considered as 'empowering' and included the autonomy supportive, task-involving and relatedness supportive dimensions. In line with our theory-driven hypotheses (Duda, 2013), these dimensions represent a motivational environment that should enable an athlete to take ownership over his/her participation, develop connections with team members and feel competent by trying hard and mastering new skills. Dimensions of a more

'empowering' environment have been linked to a variety of positive outcomes in sport settings, including athletes' reporting high levels of enjoyment, more self-determined motivation, and greater persistence (Duda & Balaguer, 2007; Reinboth et al., 2004).

The second hypothesized factor was assumed to be 'disempowering'. Based on findings from the tested models, the best fit was achieved by excluding the ego-involving dimensions from the analysis. Therefore, in this sample of young grassroots athletes, a disempowering environment was reflected when the coach was controlling and relatedness thwarting. In previous sport research, controlling motivational environments have been associated with negative cognitive, affective and behavioural responses among athletes (Bartholomew et al., 2010). The relatedness thwarting dimension included items such as 'belittles (makes an attempt to embarrass) athletes' and similar to hostile teaching environments would be expected to have a negative influence on athletes' autonomous motivation and overall functioning in the context at hand (Skinner & Edge, 2002). In future research, it would be interesting to examine the implications of objectively assessed (via the MCCOS) controlling/relatedness thwarting behaviors on athletes' cognitive and emotional responses before, during and following their sport engagement.

Interestingly and contrary to our predictions, the ego-involving and structure dimensions did not significantly load onto either of the factors in the tested models. In the present sample of grassroots football coaches, the mean for the ego-involving dimension was relatively low (i.e., 0.49 on the 0 – 3 scale), indicating that observers rarely rated the potency of the observed coach behaviors in the targeted time frames as moderately or strongly ego-involving. The low mean score is not surprising given the young age of the participants and grassroots level of the soccer teams involved. Recruiting samples in which the players compete at a higher competitive level may provide more variability in ratings and potentially higher ratings of the ego-involving dimension of the environment and would allow us to

further explore the interrelationships between the assumed ‘disempowering’ environmental dimensions. Overall, this would provide further evidence on the need to include the ego-involving environment dimension, and/or whether a more general competence-thwarting dimension (which may include aspects of chaotic coaching observed by Van den Berghe et al., 2013) should be added to the MMCOS.

The role of structure within the MMCOS certainly warrants further attention. Simple correlations suggest a strong relationship between structure and a task-involving climate (r = 0.69**). This is not surprising considering that both dimensions capture behaviors that should facilitate competence. However, the definitions of a structured and task-involving climate are quite different. While structure pertains to the organisation, guidance, instruction and expectations provided to an athlete (Curran et al., 2013), a task-involving coach focuses on and emphasises success as task-mastery, valuing effort and improvement, and explaining athletes’ role importance (Newton et al., 2000).

It is important to consider that structure may play a moderating role in terms of the motivational environment and could be realised in a more or less empowering and/or disempowering manner. Indeed the interaction between structure and other dimensions of the environment have recently gained attention in sport and physical domains (Curran et al., 2013; Sierens et al., 2009). Future studies utilising the MCCOS may seek to explore this proposition and examine the interaction between observed structure and empowering as well as disempowering dimensions of the environment. Depending on the findings of future research, it may be prudent to works towards a broader competence-supportive (and competence-thwarting) dimension of the motivational environment (particularly in light of the findings of study 3).

To our knowledge, this is the first study that entailed an integration of AGT and SDT in terms of the multi-dimensional environment examined and incorporated objective

observation of features of that coaching environment in relation to athletes' basic psychological need satisfaction. Results of this multi-method investigation suggest that dimensions of the MMCOS can be used to predict athletes' more contextual (i.e., over the past 3 – 4 weeks) satisfaction of the basic psychological needs for autonomy, competence and relatedness. This provides valuable information regarding the potential contribution of the objective situational coaching environment to promoting (or undermining) quality forms of motivation (Amorose & Anderson-Butcher, 2007; Pelletier et al., 2001) as well as the well being experienced by young athletes (Adie et al., 2008).

Specifically, the results of study 3 showed a trend for observed autonomy support to positively predict athletes' autonomy need satisfaction. This supports previous sport research in which the assessment of coach-provided autonomy support was assessed via self-report questionnaires completed by the athletes (e.g., Adie et al., 2008). Unlike what was the case in study 2, structure played a prominent role in the findings of study 3 and contributed to competence and relatedness satisfaction, and trended towards significance for autonomy satisfaction. In a structured environment, the coach provides guidance and instruction which should help athletes achieve the goal of different activities, drills and exercises, and promote more efficacious interactions with their environment (Curran et al., 2013; Grolnick & Ryan, 1989). In structured environments, where the coach provides guidance and instruction, athletes may appreciate the investment of the coach's time, which could promote a sense of relatedness. It is also possible that the structure provided by the coach aids effective learning and should facilitate higher levels of performance. Research by (Mullen & Copper, 1994) suggests that positive performance is an antecedent of team cohesion, which offers a mechanism for how structure might help promote a sense of relatedness.

In the present results, controlling and relatedness thwarting environments were negatively associated with relatedness need satisfaction and relatedness thwarting was also

negatively associated with athletes' perceptions of competence. The emergence of these relationships is not surprising given the critical and coercive nature of these types of motivational environment (Bartholomew et al., 2009; Tessier, Smith, Tzioumakis et al., 2013). Future work may also use the MMCOS to examine associations between the observed controlling and relatedness thwarting dimensions of the environment and athletes' psychological need thwarting. Such research would nicely complement recent attempts to examine the darker side of the coaching environment in sport (Bartholomew et al., 2010; 2011). This would build on previous work by including and objectively assessing additional key dimensions of a disempowering motivational environment such as relatedness thwarting.

An important discussion point relates to the observed non-significant findings for the AGT dimensions of the climate and athletes' reported need satisfaction. In terms of the empowering climate, we particularly focused on the potential links between the task-involving and structure motivational environment dimensions. To explore the contribution of the 2 dimensions further, data were re-analysed excluding structure. In these models, a task-involving climate was more strongly associated with both competence and relatedness need satisfaction than in the case of model 1 that included structure. It is not surprising that there is congruence been coach-initiated task-involving and structured behaviors. However, the definition and theoretical underpinnings of the two constructs are distinct. A structured motivational climate facilitates how likely it is that a person can complete a task and realise competence at the activity, following on the instruction and organisation provided by the coach. Whereas a task-involving climate is manifested when the coach provides information or emphases related to the preferred criteria underlying feelings of success and how competence is judged (e.g., emphasising the importance of effort and mastering skills).

Going forward, it will be important to examine the interaction between task-involving and structured motivational climates, perhaps creating cluster profiles and considering how

these relate to athletes' need satisfaction as well as outcomes such as persistence and intentions to continue playing sport. It may also be prudent to consider the task-involving dimension in light of the expanded 2-by-2 achievement goal framework (Elliot & Thrash, 2001). Particularly as past research demonstrated a link between a task-involving (or mastery-focused) climate and athletes' mastery-avoidance goal adoption (Morris & Kavussanu, 2008), which has also been associated with a fear of failure (Conroy & Elliot, 2004).

A possible explanation for a number of the weak relationships is that variables observed at the situational level (i.e., the training session) were examined in relation to athletes' reported need satisfaction over the previous three to four weeks. During this time, the observed training session was one of a number of occasions in which the coach was able to interact with his or her athletes. This is referred to as context by measurement confound and has been discussed by Lorenz and colleagues (Lorenz, Melby, Conger & Xu, 2007). Lorenz et al (2007) suggest that correlations between observed and perceived variables are likely to be more substantial when individuals are asked to provide responses in relation to the specific session being observed. Therefore in the future, it will be interesting to further examine the strength of these associations when athletes are asked to indicate the satisfaction of their needs for competence, autonomy and relatedness immediately following the observed training session or match.

Overall, the findings suggest that the dimensions included in the MMCOS are able to discriminate between adaptive and maladaptive coaching styles, specifically in relation to the degree to which the climate created supports athletes' psychological need satisfaction. Although the magnitudes of the relationships are relatively modest, these findings are comparable to recent research that has studied the convergence between observed teacher behaviours and students' perceptions of that teaching environment (Haerens et al., 2013). We

also acknowledge that there are a variety of potential contributors to athletes' psychological need satisfaction, including the peer (Vazou et al., 2005) and parent created motivational environment (Gagne, Ryan & Bargmann, 2003, White, Duda & Hart, 1992). Nevertheless, findings from this study point to the important role played by the coach and suggest that the coach-created motivational environment does contribute to athletes' basic psychological need satisfaction within the sporting context.

Future Directions

There are a number of additional directions for future research stemming from the current work. It will be interesting to determine how much footage in a training session (or competition) needs to be rated to provide a valid assessment of the coach-created environment evident across the whole session. For example, if an observer rates several short clips from within a complete training session, will this provide a similarly valid description of the degree to which the environment is empowering or disempowering as rating the whole session? This is particularly important in observational research, as the process of collecting and coding footage is time and resource consuming. Recently, Reeve and colleagues (Cheon & Reeve, 2013) have begun using one overall rating to represent autonomy supportive features of the teaching environment (i.e., a single 50-minute overall rating). Their rationale was that ratings from 5 or 10-minute time blocks and one overall 50 minute rating were highly positively correlated and interchangeable. Cheon and Reeve (2013) go on to suggest that both approaches have merit in observational research and can be used to address different research questions. Findings from our present research support the decision to divide and code each videotaped training session in four quarters. However, in future studies, it may be more resource efficient to provide an overall rating for each environment dimension (i.e., 1 overall rating for autonomy support, controlling etc.).

A second direction for future research, and another procedure to validate the MMCOS, would be to conduct a micro-level analysis and rate all of the lower order behavioural strategies using the potency rating scale. An approach such as the one adopted by Haerens et al., (2013) would allow researchers to rate the individual strategies included in the MMCOS whilst retaining the rating of potency that was central when developing the present measurement system. Examining which dimensions of the environment the individual strategies most strongly relate to would provide more detailed information regarding the factorial structure of the measure. This would also help to further explicate the way ego-involving behaviors are manifested and their relation to other empowering and disempowering variables. In addition, this approach could prove particularly useful when researchers attempt to intervene and modify the coach-created environment. Knowing the strategies coaches already use to be more or less empowering and/or disempowering (Duda, 2013) will enable researchers to target specific areas for improvement.

A third direction for future study is to examine the relationship between the observed coach-created motivational environment in relation to athletes' motivational orientations and other relevant psychosocial outcomes. This would allow researchers to test the hypothesized (drawing from AGT and/or SDT) relationships between the social environment and athletes' responses using a more objective assessment of the coaching environment. This is an important application of observational systems and could reduce the chance of bias caused by the common method variance effect, thus allowing for a more rigorous test of the theoretically based sequences in question.

A final and important progression to this research is to evaluate the validity of the MMCOS in diverse samples as well as in more competitive contexts. In sport, coaches interact with their athletes in both training and matches and previous research suggests they may create a different environment in each setting (van de Pol et al., 2011). Observing

coaches in both environments would allow researchers to examine the discriminant validity of the MMCOS. It is also necessary to test the MMCOS in different samples (e.g., high performance, individual, male/female coaches) to determine the extent to which the observation system can be considered a valid measure of the motivational environment outside of a population of mainly male coaches and athletes participating in youth grassroots soccer.

Conclusion

In summary, the purpose of the current research was to describe the development and evaluate the validity and reliability of the MMCOS. The measure was developed from an integrative AGT and SDT perspective to provide a multidimensional assessment of the coach-created environment (Duda, 2013). Overall the findings provide evidence for the inter- and intra-observer reliability of the measurement system. Results also provide initial support for the construct and predictive validity of the MMCOS. We hope that in the future the MMCOS can be used to develop a theoretically driven profile of different types of coaching environment. Alongside self-report data, this observation-based (and more objective) data can be used to identify when and where researchers could intervene to aid coaches in developing more adaptive motivational environments for their athletes. Overall, this line of research creates new possibilities for studies grounded in the achievement goal and self-determination theories.

CHAPTER 3.

THE RELATIONSHIP BETWEEN THE OBSERVED AND PERCEIVED MULTIDIMENSIONAL MOTIVATIONAL COACHING ENVIRONMENT AND ATHLETE MOTIVATION

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Abstract

Objectives

The majority of research examining the relationship between the coach-created motivational and athlete motivation has relied on self-report measures. Grounded in Duda's (2013) theoretically integrated model, the present study examined: (1) the associations between athletes', coaches' and observers' reports of the multidimensional motivational coaching environment, and (2) the relationships of these different perspectives of the environment with athletes' autonomous, controlled and amotivation.

Design

We employed a cross-sectional study design and utilized mixed methods to tap the variables of interest. Multi-level statistical analyses were employed to test our hypotheses.

Methods

Seventy-four grassroots soccer coaches and 882 youth athletes from England, France, Greece and Spain were recruited. Coaches were video-recorded during a training session and observers rated the degree to which the coaching climate was autonomy supportive, controlling, task-involving, ego-involving and relatedness supportive. Athletes and coaches completed questionnaires assessing their perceptions of the coach created climate in relation to the aforementioned dimensions of the environment. Athletes also completed measure of their sport-based motivation regulations.

Results

There were weak associations between different perspectives of the multidimensional coaching environment. However, athletes', coaches' and observers' reports of features of the motivational environment emerged as significant predictors of athletes' autonomous, controlled and amotivation.

Conclusions

Results provide partial support for findings of previous studies examining athlete motivation correlates of the motivational environment relying solely on self-report measures. Findings also point to the value of adopting a mixed-methodological approach and including athletes', coaches' and observers' reports of the environment when time and resources allow.

Keywords: Achievement Goal, Self-determination, Motivational Environment, Observation, Coaching, Mixed-Methods

Introduction

The coach-created motivational environment has been found to be a key determinant a variety of cognitive, affective and behavioral outcomes (Adie, Duda & Ntoumanis, 2008; Duda & Balaguer, 2007). These outcomes include the extent to which athletes are motivated for autonomous and controlled reasons (Amorose & Anderson-Butcher, 2007), enjoy their participation (Boixados, Cruz, Torregrosa & Valiente, 2004) and hold intentions to continue taking part in sport (Pelletier, Fortier, Vallerand & Briere, 2001).

Two popular theories of motivation, namely achievement goal theory (AGT; Nicholls, 1989) and self-determination theory (SDT; Deci & Ryan, 2000), place importance on the social psychological environment created by significant others (such as the coach) for the quality of athletes' sport experiences. To date, much of our understanding of the coaching environment drawing from these two theoretical perspectives has been based on research utilizing athletes' self-reported views regarding the characteristics of the environment created. It has been suggested that coaches' own perceptions and independent observers' ratings should also be considered when assessing the coach-created environment (Duda & Balaguer, 2007). In past work, studies have assessed the coach-created motivational environment from different perspectives. This has included ratings made by independent observers (Tessier et al., 2013), coaches' own perceptions (Stebbings, Taylor & Spray, 2011) and, most often, athletes' views regarding the features of the environment manifested on their team (Adie et al., 2008; Reinboth, Duda & Ntoumanis, 2004). However, these studies have typically considered only one methodological approach in isolation. Triangulating assessments of the motivational environment and collecting parallel data from coaches' and athletes', as well as independent observers, should provide a more comprehensive assessment of the environment (Duda, 2001; Ntoumanis, 2012). In addition, when determining the concomitants of the coach-created environment, researchers have suggested that using

alternative methodologies (such as external observations) enables a more conservative test of relationships between theoretically-based dimensions of that environment and athlete responses, such as motivation, thereby avoiding issues related to common method variance (De Meyer et al., 2013). Ultimately, this multi-method approach can help identify where there is a shared understanding (between athletes and their coaches) and more or less accurate perspectives of the prevailing motivational environment and be used to inform decisions on where to focus any future intervention efforts (i.e., whether to target the coach and/or athlete) (Ntoumanis, 2012). To date, the majority of research on the coach-created motivational climate has drawn from AGT and/or SDT.

Coach-Created Motivational Environment

Achievement goal theory Research grounded in AGT has highlighted two key dimensions of the coach-created motivational climate that are expected to influence how athletes define and construe competence within the sport setting, namely a task- and ego-involving motivational climate (Duda, 2001). When a coach is more task-involving, he/she emphasizes the importance of effort, self-improvement, cooperation and role importance. In contrast, a strongly ego-involving motivational climate is fostered when a coach emphasizes the importance of superiority, outperforming others, rivalry within the team and punishes mistakes (Newton, Duda & Yin, 2000). A considerable body of research has highlighted the adaptive and maladaptive implications of task- and ego-involving motivational climates, respectively (see Duda & Balaguer, 2007 for a review).

Self-determination theory Grounded in the SDT framework, research has identified six dimensions of the social environment that are expected to influence the quality of an athletes' motivation, namely the extent to which the environment is autonomy supportive and controlling, relatedness supportive and relatedness thwarting, and marked by structure and chaos. Autonomy support is characterized by a coach encouraging athletes to take control

over their participation and behaviors nurturing athletes' interests and preferences. A relatedness supportive environment fosters a sense of belonging and encourages trust and respect while structure relates to the information, organization and guidance given by the coach (Mageau & Vallerand, 2003). Controlling motivational environments coerce athletes and pressure them to behave in ways reflective of the coaches' own interests and values. Relatedness thwarting environments are harsh, cold and critical, while chaotic environments are ambiguous, unclear and lack direction (Bartholomew, Ntoumanis & Thøgersen-Ntoumani 2010; Van den Berghe et al., 2013). A number of studies in sport and PE have highlighted the adaptive implications of autonomy supportive, relatedness support and structured environments (Amorose & Anderson-Butcher, 2007; Curran, Hill & Niemiec, 2013; Reinboth et al., 2004). In contrast, controlling environments have been linked to more maladaptive responses (Bartholomew et al., 2010).

An Integrated Assessment of the Motivational Environment Past research has pulled from AGT and SDT and considered multiple dimensions of the coach-created motivational environment. For example, Reinboth et al., (2004) observed autonomy supportive, task-involving and socially supportive features of the coaching environment to be positively associated with the satisfaction of athletes' autonomy, competence and relatedness need satisfaction, respectively. More recently, Quested and Duda (2010) found that autonomy supportive, task-involving and ego-involving features of the teaching environment accounted for unique variance in dancers' motivational responses in the form of psychological need satisfaction, thereby highlighting the importance of considering the motivational environment in an integrative way. Based on the tenets of AGT and SDT and a plethora of research studies, Duda (2013) conceptualized environments that are autonomy supportive, task-involving and relatedness supportive, and promote higher quality forms of motivation as *empowering*. In contrast, environments marked by controlling, ego-involving and relatedness

compromising features, and promote lower quality forms of motivation are considered *disempowering*.

Relationship between Athlete, Coach and Observers' Reports of the Environment

In previous studies researchers have examined the associations between coaches', athletes' and observers' reports on discrete coaching behaviors using the Coaching Behavior Assessment System (CBAS; Smith, Smoll & Hunt (1977). When using the CBAS, Smith, Smoll and colleagues (Curtis, Smith & Smoll, 1979) reported weak and non-significant relationships between coach, athlete and observer ratings of coach behavior. An exception was for punitive dimensions of behavior where athletes, coaches and observers' perspectives were significantly related. To our knowledge, only one study has attempted to examine coach, athlete and observer agreement on dimensions specifically related to the motivational coaching environment, and this was conducted via an AGT theoretical lens (Boyce, Gano-Overway & Campbell, 2009). Contrary to the findings of Smith, Smoll and colleagues, Boyce et al., found moderate correlations between coaches and athletes on task- and ego-involving dimensions of the environment. However, weaker relationships were noted between observers and coaches on the task-involving dimension, and observers and athletes on both the task- and ego-involving dimensions.

Within physical education settings, Haerens et al., (2013) and De Meyer et al., (2013) examined the relationship between observations and students' perceptions of autonomy supportive, relatedness supportive, structured and controlling teaching. Haerens et al., (2013) found modest, but nonetheless significant, relationships between observed teacher behaviours and students' perceptions of the degree of autonomy support and relatedness support provided by their teacher. In a subsequent study, significant and positive associations were also found between observed and student perceived controlling teaching behaviours (De Meyer et al., 2013). The current study addresses gaps in literature by examining the

relationships between coaches', athletes' and observers' reports on the multidimensional motivational coaching environment manifested in youth sport, conceptualized within an integrated AGT and SDT perspective (Duda, 2013).

Coach-Created Environment and Athlete Motivation

Pulling from SDT (Deci & Ryan, 2000), an individual's motivation varies in the degree to which it is more or less self-determined. More specifically, motivation can be considered on a motivational continuum (Vallerand, 1997) ranging from intrinsic motivation to amotivation. Intrinsic motivation is reflected when one engages in an activity out of interest and enjoyment (Deci & Ryan, 2000). Intrinsic motivation has been found to positively predict a variety of adaptive cognitive, affective and behavioral responses (Haggar & Chatzisarantis, 2007). At the opposite end of the continuum is amotivation. This is considered to be an absence of motivation and relates to more maladaptive patterns of behavior including intentions to drop out of sport (Pelletier et al., 2001). Between intrinsic motivation and amotivation are a variety of extrinsic motivation regulations varying in their degree of internalization. Identified regulation is considered to be the most self-determined form of extrinsic motivation and is associated with taking part in an activity as it holds importance to the self and personal value (Vallerand & Ratelle, 2002). Participating in sport for identified reasons has been associated with a number of positive psychological responses (Vallerand & Ratelle, 2002). Introjected motivation is evident when a person engages in sport to avoid feelings of guilt or negative emotions and has emerged as a predictor of more maladaptive responses (Vallerand & Ratelle, 2002). The most extrinsic form of motivation is labeled external regulation and involves participating to receive a reward, prize and/or to avoid punishment (Haggar & Chatzisarantis, 2007).

A number of studies grounded in AGT or SDT have tested the relationship between athletes' own perceptions of facets of the coaching environment and their sport-based

motivation. Typically environments marked by autonomy supportive and task-involving features (i.e., more empowering according to Duda, 2013) predict more self-determined forms of motivation (Amorose & Anderson-Butcher, 2007; Sarrazin, Vallerand, Guillet, Pelletier & Cury, 2002). Although relatedness supportive environments are yet to be explored in relation to athlete motivation, evidence supports the positive relationship between socially supportive and caring motivational coaching environments with relatedness need satisfaction (Reinboth et al., 2004) and indicators of quality motivation (Fry & Gano-Overway, 2010) respectively. In contrast, environments that are marked by controlling and ego-involving features (i.e., more disempowering; Duda, 2013) have been related to more extrinsic and controlled forms of motivation (De Meyer et al., 2013; Pelletier et al., 2001).

To date, sport-based findings linking the coaching environment and athletes' motivation are exclusively based on athletes' own reports of both independent (i.e., dimensions of the coaching environment) and dependent variables (i.e., motivation). It is important to examine whether these relationships hold when adopting a mixed method and multi-perspective approach (Keegan, Spray, Harwood & Lavallee, 2011). It is possible that the strength and direction of the relationships between the differing perspectives (e.g., coach perceptions, observer etc.) of the environment and athlete motivation may be different. Differences in associations would be expected, particularly as there tends to be only a low level of agreement between coaches', athletes' and observers' reports of the same environment (Curtis et al., 1979; Haerens et al., 2013). Furthermore, we would predict that triangulating the motivational environment by considering multiple perspectives (i.e., coach, athlete and observers reports) might result in a better model fit than when using athletes' self-reports alone. This would reaffirm the importance of utilizing multi-method and multi-perspective approaches when considering phenomenon such as the motivational environment created by the coach (Campbell & Fiske, 1959).

Objectives

The first aim of this research was to explore the inter-relationships between coaches' and athletes' perceptions and observers' ratings of the coach-created motivational environment. Weak and non-significant relationships were expected for empowering dimensions of the motivational environment across all configurations (e.g., athlete-coach, athlete-observer, coach-observer). For disempowering dimensions of the environment, weak-to-moderate significant relationships were expected across all configurations.

The second aim of was to examine the relationships between the multidimensional motivational coach-created environment and athletes' self-reported motivation. We expected athletes' perceptions of the coaching environment would be a significant predictor of their own motivation. For athletes' perceptions of the environment, it was hypothesized that the 'empowering' dimensions (i.e., autonomy support, task-involving, social support) would predict more autonomous forms of motivation (i.e., intrinsic and identified) and the 'disempowering' features (i.e., controlling and ego-involving) would predict more controlled forms of motivation (i.e., introjected, external and amotivation). The relationship between coach-perceived and observers' ratings of the environment to athlete motivation were expected to be weak but significant. It was also hypothesized that predicting athletes' autonomous, controlled and amotivation using a triangulated assessment of the environment (when the different perspectives of the environment were included together as predictors) would result in a significantly better model fit than when including athletes' perceptions alone.

Method

Participants

Seventy-four grassroots football coaches and 926 athletes from their teams were recruited to take part in the project. There were 17 coaches and 171 athletes from England; 22

coaches and 309 athletes from Greece; 17 coaches and 193 athletes from France; and 18 coaches and 253 athletes from Spain. The coaches had an average age of 36.84 years (*SD* =11.67 years), had been coaching football for 7.33 years (*SD* = 5.75 years), and been with their current team for 1.56 years (*SD* = 1.90 years). Athletes ranged from 9 to 14 years old and had an average age of 11.47 years (*SD* = 1.42 years). The athletes had been with their respective team for 3.17 years (*SD* = 2.13 years) and spent around 4 hours per week with their coach (*M*Hours = 4.34, *SD* = 1.70 hours).

Procedure

A subsample of participants from the Promoting Adolescent Physical Activity (PAPA) project (Duda et al., 2013) were recruited to take part in this study. At the onset of the project, coaches and athletes were informed about the nature of the research and provided informed consent to take part. Ethical procedures were in line with the guidelines and requirements of the respective partner Universities in England, Greece, France and Spain. Due to the young age of the athletes, their parents, or legal guardian(s), were given a 2-week period to opt their child out of the study. No parents chose to opt their child out of the study.

After consenting to be involved in the research, coaches were recorded during a training session between September and November during the 2011 - 2012 football season. On the day of recording, a researcher visited the training ground and recorded the session using a camcorder (JVC Everio GZ-EX310), digital voice recorder (Olympus VN-702) and microphone (Olympus ME15). After the initial setup, the researcher positioned himself/herself in a non-intrusive location away from the side of the training area. Once recording had begun, the coach was allowed to continue undisturbed until the close of the session. These steps were taken to reduce the likelihood of a Hawthorne effect taking place (Adair, Sharpe & Huynh, 2007). As soon as possible after the recording session (1 – 3 weeks), coaches and their athletes were asked to complete a multi-section questionnaire

tapping their typical perceptions of the coaching environment over the past 3- 4 weeks, and motivation to take part in football.

Measures

Prior to the study, measures were translated and back-translated into Greek, French and Spanish following the procedure reported by Duda et al., (2013).

Observed Motivational Environment Recordings of the coach were coded using the MMCOS (Smith et al., in press). Coach behaviors were rated according to the potency of 5 environmental dimensions, namely the extent to which they were autonomy supportive, controlling, task-involving, ego-involving and relatedness supportive. Each video was split into 4 equal quarters and when making the ratings, independent coders were instructed to follow a marking scheme and given a list of behavioral strategies that are indicative of each of the 5 environmental dimensions (coding materials available from first author on request). Within the MMCOS, there are 6 strategies that inform whether the coach emphasized an autonomy supportive environment e.g., 'provides meaningful choices'; 6 strategies for the controlling dimension e.g., 'uses extrinsic rewards'; 4 strategies for the task-involving dimension e.g., 'emphasizes effort and improvement'; 3 strategies for the ego-involving dimension e.g., 'punishes mistakes'; and 5 strategies for the relatedness supportive dimension e.g., 'ensures all athletes are included in drills, activities and exercises' . Based on the frequency, intensity and pervasiveness (i.e., potency) of the behavioral strategies, coders rated the 5 dimensions on a 4-point potency scale ranging from 0 to 3 (0 – not at all; 1 – weak potency; 2 – moderate potency; 3 – strong potency).

Initial research has supported the validity and reliability of the MMCOS in a team sport environment across 3 European countries (Smith et al., in press). Two-way random intra-class correlation coefficients were used to determine the reliability of each of the environment dimensions. Based on the cut points proposed by Portney and Watkins (2009),

all 5 dimensions of the environment were coded to a moderate to good degree of reliability (autonomy support = 0.80; controlling = 0.87; task-involving = 0.70; ego-involving = 0.68; relatedness supportive = 0.77).

Coder Training To ensure a high degree of reliability, coders completed six hours of training including informative presentations and interactive seminars addressing the theoretical tenets underpinning the MMCOS, as well as collaborative and independent coding (coder training materials available from first author on request). At the end of training, coders were asked to independently rate two recordings using the MMCOS. To establish inter-rater reliability, the coders' ratings were compared to a 'gold standard' rating made by the lead researchers in each of the three countries. Before rating the footage, coders were required to surpass the reliability value of ICC = 0.70.

Athlete Perceptions of the Motivational Environment To capture athletes' perceptions of the multidimensional coaching environment, the Empowering and Disempowering Motivational Climate Questionnaire-Coach was employed (EDMCQ-C; Appleton et al., under review). Based on Duda's (2013) conceptualization of the multi-dimensional coach-created climate that considers key facets of the environment from an AGT and SDT perspective, this 30 item scale captures the extent to which athletes perceive their coach to be autonomy supportive, controlling, task-involving, ego-involving and socially supportive (i.e., relatedness supportive).

When completing the EDMCQ-C, participants were asked to respond to the stem, "During the past 3 – 4 weeks on this team…" which included the time period of observations, and rate their answer on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). To capture athletes' perceptions of autonomy support, 5 items were included e.g., "my coach gives players choice and options". Seven items were used to tap into the extent to which athletes perceived their coach to be controlling e.g., " my coach only rewards

players with prizes or treats if they have played well". Nine items tapped into the task-involving dimension of the coaching environment and 6 items considered ego-involving features of the environment. Example task-involving items include "my coach makes sure everyone has an important role on the team" and ego-involving items "my coach has his or her favorite players". Finally, 3 items were utilized to capture the athletes' perceptions of social support e.g., "my coach really appreciates players as people, not just as footballers. The task- and ego-involving subscales demonstrated an acceptable level of reliability (i.e., 0.79 and 0.70). Subscales tapping autonomy support, controlling and social support exhibited lower internal reliability (i.e., 0.57, 0.64 and 0.41 respectively). However, scales containing few items are more prone to be characterized by lower reliability coefficients (Whitley & Kite, 2012).

Coaches' Perceptions of the Motivational Environment Coaches' perceptions of their own coaching environment were also assessed using the EDMCQ-C (Appleton et al., under review). The questionnaire stem was modified for the coach questionnaire following the same approach as taken by Stebbings et al., (2011). Coaches were asked to respond to the stem "During the last 3 – 4 weeks, on the team I named above…". Similar to the athlete questionnaire, the subscales for task- and ego-involving were close to acceptable levels (i.e., 0.69 and 0.67). Subscales tapping autonomy support, controlling and relatedness support were lower (i.e., 0.50, 0.60 and 0.50 respectively).

Athletes' Motivational Regulations To examine athletes' motivation to participate in sport, the Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge & Rose, 2008) recently modified for youth sport (Viladrich et al., 2013) was administered. In total, 23 items from the BRSQ were included that tapped into 5 types of motivation regulation; intrinsic motivation, identified regulation, introjected regulation, external regulation and amotivation.

Athletes responded to the stem "I play football for this team…" and there were 4 items included to assess intrinsic motivation (e.g., because I enjoy it), 4 items to assess identified regulation (e.g., because I value the benefits), 4 items to examine introjected regulation (e.g., because I would feel guilty if I quit), 7 items concerned with external regulation (e.g., because people push me to play), and 4 items related to amotivation (e.g., but I really don't know why anymore). In the past, the BRSQ has been demonstrated as a valid and reliable measure of motivation regulations in sport (Lonsdale et al., 2008). In the present study and across the 4 countries, the subscales demonstrated a moderate-to-good level of reliability, which can be considered acceptable given the small number of items within each subscales (Whitley & Kite, 2012) (intrinsic = 0.67; identified = 0.64; introjected = 0.67; external = 0.79; amotivation = 0.82).

Analyses

Aggregated scores in the form of means and standard deviations were computed for coaches' and athletes' reports of the 5 assessed environmental dimensions. For observations, the ratings made by the 2 coders were averaged and an overall mean score was computed for each dimension. With respect to athletes' motivation, a mean score was calculated for the individual regulations before computing composite scores for autonomous (intrinsic & identified) and controlled motivation (introjected & external) following the procedure used by Sheldon and Elliot (1998). Descriptive statistics and bivariate correlations between variables can be seen in the table 1.

Due to the nature of the data, with athletes nested within teams (i.e., coaches), multilevel analyses were necessary to examine the convergence between the observed, coach perceived, and athlete perceived reports of the environment. All analyses were conducted using Predictive Analytics SoftWare (PASW; previously SPSS) Version 18.0.02. The specified model included 74 coaches at Level 2 and 882 athletes at Level 1. Following Hox's

(2010) recommendations, the first step involved running baseline component models to determine the amount of variance attributed to the grouping of athletes within teams for each of the five dependent variables (i.e., athletes' perceptions of coach-provided autonomy support, controlling, task-involving, ego-involving and social support). Intra-class correlation values (ICC) of 8.43% for autonomy support, 10.70% for controlling, 16.92% for task-involving, 21.36% for ego-involving and 10.19% for relatedness support suggesting that a significant amount of variance in the athletes' reports of the 5 environment dimensions could be attributed to the grouping of athletes within teams (i.e., within coach). In the second step, observed dimensions of the coaching environment were included as covariates and specified as fixed effects in the analysis. To examine the relationship between coach and athletes' reports of the environment, the steps above were repeated replacing observational predictor variables with coaches' perceptions of the environment. Bivariate correlations were used to examine the relationships between observed and coach-perceived environment dimensions as they were situated at the same level.

Following the procedure outlined previously, baseline variance component models (i.e., empty models) were run to examine the variance attributed to the team level for autonomous motivation (29.04%), controlled motivation (5.26%) and amotivation (8.35%). We then ran a series of models which included athletes' age, years playing for their team and hours per week with team as predictors of autonomous motivation, controlled motivation and amotivation. Athletes' age was significantly and negatively related to both controlled and amotivation. Therefore 'age' was included alongside other predictors in the following models.

After the initial exploratory steps mentioned above, model 1 involved adding athletes' perceptions of the motivational environment as predictors of autonomous motivation, controlled motivation and amotivation. In model 2, coach perceived dimensions of the

environment were included as predictors of athletes' motivation and in model 3 observers' ratings were used to predict the three types of athlete motivation. A final step (i.e., model 4) involved adding the three different perspectives of the motivational coaching environment in parallel, to examine whether the triangulated assessment of the environment resulted in a significantly improved model fit as assessed via change in -2Log.

All predictor variables were mean centered prior to being included in the different analyses within the present study. To determine the significance of all multi-level analyses conducted within this study, the -2Log reference model was compared to the predictor model(s) and examined in relation to chi-squared value at *k* degrees of freedom. This provides an indication of model fit at the specified level of significance.

Results

Associations between observed and athlete-perceived dimensions of the environment were weak and non-significant, partially consistent with our hypothesis (see table 2 in supplementary material). A number of significant relationships were revealed between coaches' perceptions of the environment and athletes' perceptions of that same climate. Coaches' perceptions of their controlling behavior were positively associated with athletes' perceptions of controlling ($\beta = 0.30$, $p < 0.01$) and ego-involving coaching ($\beta = 0.36$, $p < 0.01$), and negatively related to autonomy supportive ($\beta = -0.19$, $p < 0.01$), task-involving ($\beta = -0.17$, $p < 0.05$) and relatedness supportive ($\beta = -0.19$, $p < 0.05$) dimensions of the environment. There was also a significant positive relationship between coach-perceived task-involving behaviors and athletes' reports of relatedness support ($\beta = 0.29$, $p < 0.05$) from their coach. A significant negative relationship between coach-perceived autonomy support provision and athletes' reports of autonomy supportive coaching emerged ($\beta = -0.17$, $p < 0.05$). All tested models demonstrated a significant improvement in model fit as indicated by a reduction in -2Log (see table 3 in supplementary material).

Table 1

Bivariate correlations between study variables

	M(SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 ATH AS	4.03 (0.62)	1																	
2 ATH TI	4.20 (0.57)	.68**	1																
3 ATH RS	3.93 (0.72)	.49**	.53**	1															
4 ATH CO	2.36 (0.71)	-.21**	-.27**	-.20**	1														
5 ATH EI	2.38 (0.81)	-.21**	-.30**	-.21**	.65**	1													
6 COA AS	4.42 (0.44)	-.00	.04	.05	-.01	.00	1												
7 COA TI	4.54 (0.34)	.07*	.07*	.11**	.01	-.06	.68**	1											
8 COA RS	4.48 (0.49)	.09**	.08*	.07*	-.03	-.08*	.60**	.66**	1										
9 COA CO	2.35 (0.49)	-.09**	-.10**	-.07*	.13**	.20**	-.12**	-.09**	-.17**	1									
10 COA EI	1.86 (0.55)	-.01	-.03	-.01	.02	.09**	-.32**	-.30**	-.26**	.61**	1								
11 OBS AS	1.00 (0.51)	.05	.09**	.06	-.04	-.10**	.20**	.05	.12**	-.23**	-.08*	1							
12 OBS TI	1.51 (0.62)	-.06	-.03	-.09**	-.00	-.11**	-.09**	-.22**	-.04	-.37**	-.19**	.36**	1						
13 OBS RS	1.49 (0.55)	-.06	-.02	-.06	-.01	-.12**	-.15**	-.25**	-.13**	-.22**	.00	.55**	.62**	1					
14 OBS CO	1.22 (0.49)	-.07*	-.10**	-.10**	.09**	.06	-.29**	-.13**	-.30**	.11**	-.03	-.40**	.08*	-.21**	1				
15 OBS EI	0.59 (0.43)	.01	-.04	-.05	.01	.07*	-.06	-.12**	-.25**	.08*	.15**	-.03	.09*	.08*	.26**	1			
16 AUTO	4.04 (0.69)	.21**	.24**	.13**	.00	-.05	-.15**	-.17**	.00	-.17**	-.11**	.06	.37**	.17**	.04	.01	1		
17 CONT	2.53 (0.81)	-.07*	-.06	-.05	.35**	.34**	-.01	-.01	-.03	.03	-.03	-.03	.03	-.04	.09*	-.02	.25**	1	
18 AMOT	1.84 (0.95)	-.16**	-.19**	-.11**	.36**	.33**	.02	.03	-.01	-.04	-.09**	-.01	.05	.03	.06	-.01	-.02	.56**	1

Note. N Coach Observations = 74, *N* Coach Perceptions = 74, *N* Athlete Perceptions = 926. * p <0.05, ** p <0.01. ATH = Athletes' Perceptions, COA = Coaches' Perceptions, OBS = Observations, AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting, AUTO = Autonomous Motivation, CONT = Controlled Motivation, AMOT = Amotivation.

Correlations between coach and observer reports of the motivational environment can be seen in table 1. Observed autonomy support was significantly positively correlated with coach perceived autonomy support and relatedness support, and significantly negatively related to coach perceived controlling and ego-involving behaviors. Observed disempowering features were significantly positively correlated with coach perceived disempowering dimensions and negatively correlated with coaches' perceptions of an empowering environment. There were several inconsistent findings. Observed task-involving coaching behaviors were significantly negatively correlated with coach perceived autonomy support and task-involving behaviors. Further, observed relatedness support was significantly negatively associated with coaches' perceptions of an autonomy supportive and task-involving environment.

Table 2

Multilevel analyses between observed and athlete perceived dimensions of the environment

	Athlete Perceptions				
	Autonomy Support (*SE*)	Controlling (SE)	Task-involving (*SE*)	Ego-involving (SE)	Relatedness Support (*SE*)
Fixed Part: Observation					
Autonomy Supportive	0.10 (0.07)	-0.01 (0.08)	0.10 (0.08)	-0.02 (0.11)	0.14 (0.08)+
Task-involving	-0.02 (0.06)	-0.05 (0.08)	0.01 (0.07)	0.07 (0.11)	-0.06 (0.07)
Relatedness Supportive	-0.13 (0.07)	0.06 (0.09)	-0.09 (0.08)	-0.11 (0.10)	-0.13 (0.09)
Controlling	-0.10 (0.07)	0.16 (0.08)+	-0.09 (0.08)	0.10 (0.11)	-0.13 (0.08)+
Ego-involving	0.05 (0.07)	-0.03 (0.08)	-0.02 (0.08)	-0.07 (0.13)	-0.01 (0.08)
Random Part: Intercept-Only Model					
T.L.V	0.03 (0.01)	0.05 (0.02)	0.06 (0.01)	0.14 (0.03)	0.05 (0.02)
A.L.V	0.36 (0.02)	0.45 (0.02)	0.27 (0.01)	0.52 (0.03)	0.47 (0.02)
Random Part: Multiple Predictor Model					
T.L.V	0.03 (0.01)	0.05 (0.02)	0.05 (0.01)	0.13 (0.03)	0.04 (0.01)
A.L.V	0.36 (0.02)	0.45 (0.02)	0.27 (0.01)	0.52 (0.03)	0.47 (0.02)
Test of Significance					
Reference model	1643.04	1861.15	1449.28	2024.66	1895.34
Δ -2LL	1634.11	1856.80	1443.74	2019.45	1883.94
χ^2 *(df)*	8.93 (5)	4.35 (5)	5.54 (5)	5.21 (5)	11.4 (5)*

Note. N Coach Observations = 74, *N* Athlete Perceptions = 926. T.L.V = team level variance, A.L.V = athlete level variance. + p <0.10, * p <0.05, ** p <0.01, *** p < 0.001. χ^2 *(df)* = represents difference from the reference model

Table 3

Multilevel analyses between coach and athlete perceived dimensions of the environment

	Athlete Perceptions				
	Autonomy Sup (*SE*)	Controlling (SE)	Task-involving (*SE*)	Ego-involving (SE)	Relatedness Sup (*SE*)
Fixed Part: Coach Perceptions					
Autonomy Supportive	-0.17 (0.09)*	-0.05 (0.11)	-0.07 (0.10)	0.13 (0.15)	-0.04 (0.11)
Task-involving	0.17 (0.11)	0.09 (0.14)	0.09 (0.13)	-0.08 (0.19)	0.29 (0.15)*
Relatedness Supportive	0.13 (0.07)+	-0.07 (0.09)	0.10 (0.08)	-0.13 (0.12)	0.01 (0.09)
Controlling	-0.19 (0.07)**	0.30 (0.09)**	-0.17 (0.08)*	0.36 (0.12)**	-0.19 (0.09)*
Ego-involving	0.10 (0.06)	-0.13 (0.08)+	0.08 (0.07)	-0.06 (0.11)	0.12 (0.08)
Random Part: Baseline Variance Component Model					
T.L.V	0.03 (0.01)	0.05 (0.02)	0.06 (0.01)	0.14 (0.03)	0.05 (0.02)
A.L.V	0.36 (0.02)	0.45 (0.02)	0.27 (0.01)	0.52 (0.03)	0.47 (0.02)
Random Part: Multiple Predictor Model					
T.L.V	0.02 (0.01)	0.04 (0.01)	0.05 (0.01)	0.10 (0.02)	
A.L.V	0.35 (0.02)	0.45 (0.02)	0.27 (0.01)	0.52 (0.03)	
Test of Significance					
Reference model	1643.04	1861.15	1449.28	2024.66	1895.34
Δ -2LL	1601.27	1824.58	1424.89	1989.43	1870.37
χ^2 *(df)*	41.77 (5)***	36.57 (5)***	24.39 (5)***	35.23 (5)***	24.97 (5)***

Note. N Coach Perceptions = 74, *N* Athlete Perceptions = 926. T.L.V = team level variance, A.L.V = athlete level variance. + p <0.10, * p <0.05, ** p <0.01, *** p < 0.001. χ^2 *(df)* = represents difference from the reference model

The relationships between the different perspectives of the motivational environment and athlete motivation can be found in table 4 of the supplementary material. Three models were tested to compare the predictive effects of athletes', coaches' and observers' reports of the motivational environment on athletes' autonomous, controlled and amotivation.

For autonomous motivation, athletes' reports of a task-involving (β = 0.29, $p < 0.001$) climate emerged as a significant positive predictor. There was also a trend for athletes' perceptions of autonomy support (β = 0.08, $p < 0.10$) to predict more autonomous motivation. In comparison, coaches' perceptions of creating an autonomy supportive (β = -0.30, $p < 0.05$) and task-involving (β = -0.38, $p < 0.05$) climate were negatively related to athletes' autonomous motivation. However, coach perceived relatedness support (β = 0.25, $p < 0.05$) was positively linked to athletes' autonomous motivation. In the third model, an observed task-involving (β = 0.47, $p < 0.001$) climate emerged as a significant positive predictor of autonomous motivation. All models demonstrated a significant improvement in fit calculate by the reduction in -2Log.

With respect to athletes' controlled motivation, age was a significant negative predictor (β = -0.08, $p < 0.001$). Indicating that as the athletes got older their controlled motivation decreased. In the first model, athletes' perceptions of a controlling (β = 0.23, $p < 0.001$) and ego-involving (β = 0.25, $p < 0.001$) environment both positively predicted their controlled motivation. In model 2, coaches' perceptions of controlling (β = 0.20, $p < 0.05$) coaching positively predicted athletes' controlled motivation. There was a trend for a negative relationship between coach-perceived ego-involving (β = -0.15, $p < 0.10$) behaviors and athletes' controlled motivation. In model 3, observed controlling coaching (β = 0.18, $p < 0.05$) positively predicted athletes' controlled motivation.

Table 4

Multilevel analyses between perspectives of the environment and athlete motivation

	Athlete Motivation							
	Autonomous				Controlled			
Fixed Part	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
A_Age	-0.00 (0.02)	-0.01 (0.02)	0.01 (0.02)	0.02 (0.02)	-0.08 (0.02)***	-0.07 (0.02)**	-0.08 (0.02)**	-0.10 (0.02)***
A_AS	0.08 (0.04)+	-	-	0.08 (0.04)+	-0.05 (0.06)	-	-	-0.03 (0.06)
A_TI	0.29 (0.05)***	-	-	0.28 (0.05)***	0.09 (0.07)	-	-	0.07 (0.07)
A_ RS	0.05 (0.03)	-	-	0.05 (0.03)+	0.03 (0.04)	-	-	0.03 (0.04)
A_CO	0.03 (0.04)	-	-	0.03 (0.04)	0.23 (0.05)***	-	-	0.22 (0.05)***
A_EI	0.02 (0.03)	-	-	0.04 (0.03)	0.25 (0.04)***	-	-	0.25 (0.04)***
C_AS	-	-0.30 (0.14)*	-	-0.27 (0.13)*	-	-0.00 (0.11)	-	-0.01 (0.09)
C_TI	-	-0.37 (0.17)*	-	-0.23 (0.16)	-	-0.07 (0.15)	-	-0.13 (0.12)
C_RS	-	0.25 (0.11)*	-	0.21 (0.10)*	-	-0.06 (0.09)	-	-0.00 (0.08)
C_CO	-	-0.11 (0.11)	-	0.09 (0.10)	-	0.20 (0.09)*	-	0.05 (0.07)
C_EI	-	-0.13 (0.10)	-	-0.17 (0.09)+	-	-0.15 (0.08)+	-	-0.06 (0.06)
O_AS	-	-	-0.10 (0.09)	-0.07 (0.09)	-	-	0.11 (0.08)	0.14 (0.07)*
O_TI	-	-	0.47 (0.08)***	0.45 (0.08)***	-	-	0.03 (0.07)	0.06 (0.06)
O_RS	-	-	-0.06 (0.10)	-0.06 (0.10)	-	-	-0.14 (0.09)	-0.18 (0.07)*
O_CO	-	-	-0.03 (0.09)	-0.03 (0.09)	-	-	0.18 (0.08)*	0.13 (0.07)+
O_EI	-	-	-0.02 (0.09)	0.04 (0.09)	-	-	-0.10 (0.08)	-0.13 (0.06)+
Reference Model	T.L.V = 0.14 (0.03) A.L.V = 0.33 (0.02) -2LL = 1625.06				T.L.V = 0.04 (0.02) A.L.V = 0.63 (0.03) -2LL = 2097.59			
Random Part:								
T.L.V	0.15 (0.03)	0.10 (0.02)	0.07 (0.02)	0.06 (0.02)	0.01 (0.01)	0.03 (0.01)	0.02 (0.01)	0.01 (0.01)
A.L.V	0.29 (0.01)	0.33 (0.02)	0.33 (0.02)	0.29 (0.02)	0.54 (0.03)	0.62 (0.03)	0.63 (0.03)	0.55 (0.03)
Δ -2LL	1518.73	1605.55	1591.74	1470.50	1950.68	2083.27	2080.09	1935.25
χ^2 *(df)*	117.04 (5)***	19.51 (5)***	33.32 (5)***	154.56 (10)***[A]	146.91 (5)***	14.32 (5)*	17.50 (5)***	162.34 (10)***

Note: N Coach Observations = 74, *N* Coach Perceptions = 74, *N* Athlete Perceptions = 926. A = Athlete perceptions, C = Coach perceptions, O = Observations. AS = autonomy support, TI = task-involving, RS = relatedness support, CO = controlling, EI = ego-involving. T.L.V = team level variance, A.L.V = athlete level variance. + p <0.10, * p <0.05, ** p <0.01, *** p < 0.005. χ^2 *(df)* = represents difference from the reference model where age was included as a single predictor, [A]indicates significant improvement in fit from model 1 to model 4

Athlete Motivation			
Amotivation			
Model 1	Model 2	Model 3	Model 4
-0.12 (0.02)***	-0.10 (0.03)**	-0.11 (0.03)***	-0.12 (0.03)***
-0.03 (0.07)	-	-	-0.03 (0.07)
-0.14 (0.08)+	-	-	-0.15 (0.08)+
0.04 (0.05)	-	-	0.04 (0.05)
0.29 (0.05)***	-	-	0.28 (0.06)***
0.22 (0.05)***	-	-	0.24 (0.05)***
-	-0.04 (0.13)	-	-0.04 (0.12)
-	0.11 (0.18)	-	0.06 (0.16)
-	-0.14 (0.11)	-	-0.05 (0.10)
-	0.10 (0.11)	-	-0.09 (0.10)
-	-0.18 (0.10)+	-	-0.09 (0.08)
-	-	0.10 (0.10)	0.12 (0.09)
-	-	-0.05 (0.09)	-0.04 (0.08)
-	-	0.01 (0.11)	-0.01 (0.10)
-	-	0.23 (0.10)*	0.13 (0.09)
-	-	-0.12 (0.10)	-0.12 (0.09)
	T.L.V = 0.08 (0.03) A.L.V = 0.83 (0.04) -2LL = 2350.21		
0.03 (0.02)	0.05 (0.02)	0.05 (0.02)	0.02 (0.02)
0.70 (0.04)	0.83 (0.04)	0.83 (0.04)	0.70 (0.04)
2189.80	2332.36	2331.65	2178.33
160.41 (5)***	17.85 (5)***	18.56 (5)***	171.88 (10)***

Athletes' age was negatively related to amotivation (β = -0.12, $p < 0.001$). Therefore, as athletes got older their levels of amotivation decreased. In the first model, athletes' perceptions of controlling (β = 0.29, $p < 0.001$) and ego-involving (β = 0.22, $p < 0.001$) coaching positively predicted amotivation. In model 2, where coaches' perceptions of the environment were included as predictors, no significant relationships emerged. There was a trend for coaches' perceptions of an ego-involving (β = -0.18, $p < 0.10$) climate to be negatively related to athletes' amotivation. In model 3, observed dimensions of the environment were included as predictors and observed controlling (β = 0.23, $p < 0.05$) coaching positively predicted athletes' amotivation. For models 1 and 3, the addition of athletes' perceptions and observations significantly reduced the -2Log and indicated an improved model fit. After including athletes' age in the model, the addition of coaches' perceptions did not significantly improve the fit.

In a final set of models (i.e., model 4), we included the three different perspectives of the environment as predictors of athlete motivation. This was to test whether the triangulated assessment of the environment resulted in a significantly improved model fit compared to when including athletes' perceptions alone (difference between model 1 and 4). There was no significant improvement in model fit for athletes' controlled and amotivation. However, for autonomous motivation, the triangulated model (i.e., model 4) demonstrated a better model fit than when including only athletes' perceptions (i.e., model 1) χ^2 *(df)* 165.27 – 117.04 = 48.23 (*10*) $p < 0.05$. Furthermore, the observed task-involving (β = 0.45, $p < 0.001$) dimension remained a significant predictor of athletes' autonomous when considered alongside athletes' own reports of a task-involving climate.

Discussion

The present study extends previous AGT (Nicholls, 1989) and SDT-based (Deci & Ryan, 2000) research by examining the relationship between the multidimensional

motivational coaching environment, according to Duda's (2013) integration of AGT and SDT-based characteristics, and athletes' motivation via a multi-method approach. We had two main aims. First, we examined the significance of the interrelationships between key facets of the motivational coaching environment when assessed using the different methodological approaches (i.e., observations, coach perceptions and athlete perceptions). Second, we sought to compare the predictive effects of the different perspectives of the environment on athlete motivation and examine whether the inclusion of coach and observed variables, alongside athletes' perceptions, explains more of the variance in athletes' motivation.

Relationship between Athlete, Coach and Observed Motivational Environment

In line with our hypothesis, the relationships between observed and athlete perceived dimensions of the environment were weak and non-significant. However, contrary to our predictions and past work (De Meyer et al., 2013), there were no significant relationships between the observed and athlete perceived disempowering dimensions of the environment. A number of significant relationships were found between coaches' and athletes' perceptions of the same environment. As hypothesized, there were moderate positive associations between coaches' and athletes' reports on maladaptive environment dimensions. Specifically, as coaches reported creating a controlling environment, athletes also identified a more controlling and ego-involving motivational climate, and a less autonomy supportive, task-involving and relatedness supportive environment. These findings are aligned with previous research examining the interplay between coach and athlete perceptions, which showed significant associations between coaches' and athletes' reports on more punitive and disempowering dimensions of the coaching environment (Curtis et al., 1979).

Despite the significant relationships found for coaches' perceptions of a controlling environment and athletes' reports of more controlling coaching, there were a number of non-

significant findings between coaches' and athletes' reports across the more empowering dimensions as predicted. These findings are consonant with results from previous PE-based studies linking teacher and students' reports of autonomy support, interpersonal involvement and structure (Taylor & Ntoumanis, 2007). It has been suggested that coaches (or teachers) may be overly positive when rating their own behavior (Ntoumanis, 2012), which may explain the weak and non-significant findings between coach and athlete reports on empowering dimensions of the environment. Past work also suggests that individuals tend to notice, monitor and pay attention to more controlling or punitive feedback (Graziano, Brothen, & Berscheid, 1980), which may explain why significant relationships were noted for the more disempowering dimensions and not for the empowering dimensions of the motivational environment. The unexpected negative relationship noted between coach and athletes' reports of autonomy supportive coaching is likely to be the result of a suppression effect, particularly as the bivariate correlation between the two variables was .00 as seen in table 1.

Similar to the associations between coach and athlete reports of the environment, coach and observer views were significantly and positively correlated on the more disempowering dimensions. Relationships between coach and observers on the more empowering dimensions tended to be weak and non-significant. In line with the suggestion by Curtis et al., (1979), coaches seem to be more aware of when they create a controlling and ego-involving motivational environment perhaps due to the more overt and punitive nature of the type of behavioral strategies that create this climate. It is also likely that coaches understand and appreciate the importance of creating an empowering environment, however when they actually engage with their athletes they are unaware of the degree to which they utilize such behaviors (Partington & Cushion, 2011).

Coach-Created Motivational Environment and Athlete Motivation

As hypothesized, and in line with previous findings (Amorose & Anderson-Butcher, 2007; Duda & Balaguer, 2007), when athletes perceived the environment to be more empowering (i.e., autonomy supportive and task-involving), they reported more autonomous motivation. In contrast, when the environment was perceived as disempowering, athletes reported more controlled motivation and amotivation. This pattern of results is aligned with suggestions that empowering and disempowering dimensions of the environment predict adaptive and maladaptive processes and outcomes, respectively (Bartholomew et al., 2010; Balaguer et al., 2012). In essence, current findings provide support for both a 'brighter' and 'darker' motivational pathway between dimensions of the coaching (or teaching) environment and athletes' motivational responses (Haerens, Aelterman, Vansteenkiste, Soenes & Van Petegem, 2015).

Several of the relationships revealed between coach perceived dimensions of the environment and athletes' autonomous motivation were less conceptually coherent. The negative relationship between coach perceived autonomy supportive and task-involving dimensions of the environment and athletes' autonomous motivation suggest a possible misinterpretation of the environment coaches assume they create for the athletes on their team. There are a number of possible explanations for this anomaly. Similar to the discussion provided earlier in relation to aim 1, coaches may be overly positive when rating themselves. This could be indicative of a 'better-than-average' (Alicke & Govorun, 2005) effect where individuals rate the behaviors used and environment created in comparison to a normatively endorsed standard. Furthermore, although coaches and athletes were asked to reflect and respond to the questions asked over the same period (i.e., the past 3 – 4 weeks), the resources they draw from to inform their perceptions of the environment may be very different (Keegan et al., 2011). Although a number of the associations found between coach reports of the environment and the different forms of athlete motivation were as predicted, there are clearly

many questions that remain to be answered in relation to how coaches' perceptions of the environment they create impact upon the quality of athletes' participation in sport. Answering these questions if of particular importance if coaches are to be educated to modify the environment they create to promote more adaptive and autonomous forms of motivation in their athletes.

The positive relationship found between coach perceived social support and athletes' autonomous motivation suggests that when coaches report themselves to create a warm, supportive and caring environment on their team, athletes tend to value the activity and take part out of personal interest and enjoyment. In line with our hypotheses, and consistent with findings from previous studies that considered coaches' perceptions of the environment (Curtis et al., 1979), coach-perceived use of controlling behaviors positively predicted athletes' controlled and amotivation. This is a promising finding and suggests that if coaches are educated and have the opportunity to be more aware of why it is important to create a less controlling motivational environment, athletes will exhibit lower levels of controlled and amotivation.

The most unique aspect of this study was the inclusion of an objective assessment of the motivational environment to predict athletes' motivation. When coaches were observed to emphasize the importance of effort, improvement and working cooperatively (i.e., were more task-involving), athletes reported greater autonomous motivation. For these young grassroots level athletes, coaches' emphasis on self-referenced criteria for success, as observed by an independent coder, was associated with more intrinsic and self-determined reasons for participation. This supports previous research that employed self-report measures to test the relationship between perceived task-involving environments and indicators of athlete motivation in sport (Sarrazin et al., 2002). Also in line with our hypotheses, when observers rated the environment as more potently controlling, athletes reported more

controlled reasons for participating and indicated they were more amotivated. Our findings are consistent with the associations found between athlete and coach reports of the environment with controlled and amotivation. In addition, present findings are aligned with results from studies in PE that used observational measures to examine the relationship between the teaching environment and student motivation (De Meyer et al., 2013). The present findings suggest that athletes, coaches and observers have a shared understanding with regards to the disempowering features of the environment and these predict more maladaptive motivational responses in the form of controlled and amotivation.

A final aim of the present research was to examine the contribution of the different perspectives of the environment on athlete motivation. There are currently no studies that have examined the different perspectives of the environment assessed in the current study (athlete, coach and observer reports) on athlete motivation when considered in the same model (Keegan et al., 2011). We hypothesized that by triangulating the motivational environment (i.e., model 4) to predict athletes' autonomous, controlled and amotivation, we would have a better model fit. The current findings indicated no significant improvement in fit for controlled and amotivation when comparing the complex model (i.e., model 4) to a model including only athletes' perceptions of the environment (i.e., model 1). However, in the present study, the inclusion of athlete, coach and observer reports of the environment predicting athletes' autonomous motivation demonstrated a significant improvement in model fit compared to when athletes' self-reports were included alone. In addition, the observed task-involving features of the environment remained significantly positively correlated with athletes' autonomous motivation when both athletes' and observers' reports were included in the model together.

It could be argued that the finding on the significant link between observed task-involving behavior and athletes' autonomous motivation is in contrast to suggestions that

athletes' perceptions of the environment might mediate the relationship between the objective environment and athletes' responses to sport, including the quality of their motivation (Horn, 2002). It is possible that the different targeted assessments of the environment tap into unique facets of the motivational coaching environment and the objective measure might identify more features of a task-involving environment than athletes are aware of.

For controlled and amotivation, a different story emerged. When included alongside athletes' perceptions, coach perceived and observed controlling dimensions of the environment became non-significant when predicting controlled and amotivation. While the question of added "variance accounted for" clearly warrants further attention, the present findings (based on results for autonomous motivation) suggest that when it is logistically possible, researchers might attempt to include assessments of the environment from the perspective of athlete, coach *and* observer.

Limitations and Future Directions

There are a number of limitations to discuss with respect to the current study. The first relates to the different assessments of the motivational coaching environment. Specifically, the MMCOS provided a more situational assessment of the coaching environment (i.e., what a coach is observed to do at one point in time) compared to the coach and athlete questionnaires that were referenced at a more contextual level (i.e., over past 3 – 4 weeks). Although the point of observation occurred within the 3 – 4 week time window, there was multiple times in which an athlete could have interacted with his/her coach. This may explain some of the modest relationships found between observed and perceived dimensions of the environment and is referred to in the literature as context by measurement confound (Lorenz, Melby, Conger & Xu, 2007). In future studies it will be important to reference the questionnaire to the specific session being observed and reexamine the interplay between coach, athlete and observer reports of the motivational environment. Alternatively

researchers could conduct multiple observations, perhaps rating the coach during both training and matches during the 4-week time window. Observing coaches during training and matches may be more preferable to making only one observation or even multiple observations in one setting (e.g., training), particularly considering that a different environment may be created depending on the competitive nature of the context (Chaumeton & Duda, 1988) such as whether it is a training session or match (van de Pol, Kavussanu & Kompier, 2015). This would provide more information regarding how athletes construct their perceptions of the environment as well as the relative contribution of the two contexts to those perceptions.

A second limitation relates to the lower reliability coefficients noted for the some of the dimensions of the athlete and coach-perceived reports of the environment, specifically the scales for autonomy support and relatedness support. Lower levels of reliability are sometimes reported for scales with few items however findings of the present study in relation to our assessments of autonomy support and relatedness support should be interpreted with caution. Whilst the EDMCQ-C has demonstrated acceptable levels of reliability in previous use (Appleton et al., under review) future research should continue to explore psychometric properties of the measure when completed by athletes and by coaches.

Within the current study we also recruited a relatively homogenous, albeit representative, sample of athletes and coaches participating at the recreational level in grassroots soccer. In future studies it will be interesting to test the relationships between the different perspectives of the environment and athletes' motivation in adult and more elite populations, particularly as age emerged as a negative predictor of controlled and amotivation. It would also prove fruitful to examine the targeted relationships in an individual sport context. We might expect to find more significant findings, particularly for associations between the coach-perceived and observed dimensions of the environment and

athlete responses. In an individual sport, the session being assessed includes a direct interaction between coach and athlete. In this type of environment, the messages emphasized by the coach are specifically targeted towards one individual therefore are more likely to be 'picked up' by that athlete and hold direct relevance for their motivation.

A final point relates to the relevance of this research for the role of coach education programs aimed at modifying the motivational environment created e.g., Empowering Coaching™ (Duda, 2013). It would be interesting to examine whether the interrelationships between different perspectives of the environment, and the relationship with athletes' motivation, become more significant following a coach education program. This is particularly relevant to the more empowering dimensions of the environment, where athletes, coaches and observers seem to identify and pull from different cues when making the ratings (as evidenced by the non-significant findings in the present study). Going forward, the MMCOS could be used as part of the education process to encourage coaches to self-reflect on the environment created for their athletes.

Conclusion

This study highlights the importance of considering multiple perspectives of the coaching environment, drawing from an integrated AGT and SDT-based perspective. Features of the athlete, coach and observed multidimensional motivational coaching environment were shown to predict athletes' motivation to take part in sport. In general, empowering and disempowering features of the environment (Duda, 2013) predicted adaptive and maladaptive responses, respectively. Overall, our results provide partial support for previous AGT and SDT-based findings that have employed self-report measures alone and point towards the importance of collecting multi-method data to extend AGT and SDT-based research, when the time and resources are available to do so.

CHAPTER 4.

EXAMINING THE OBJECTIVE COACH-CREATED MOTIVATIONAL ENVIRONMENT ACROSS TRAINING AND COMPETITION IN YOUTH SPORT

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Abstract

Adopting an integrated achievement goal (Nicholls, 1989) and self-determination theory (Deci & Ryan, 2000) perspective, the aim of the current study was to objectively examine empowering and disempowering features of the multidimensional motivational coaching environment in training and competition in youth sport. Seventeen grassroots soccer coaches were observed and rated in training and competitive settings using the Multidimensional Motivational Climate Observation System (MMCOS). In line with our hypothesis, coaches created distinctive motivational environments in the 2 contexts. More specifically, coaches were observed to create a less empowering and more disempowering environment in competition compared to in training. The observed differences were underpinned by distinctive motivational strategies used by coaches in the 2 contexts. Findings have implications for the assessment of the coach-created motivational environment and the promotion of motivation for young athletes taking part in grassroots level sport.

Keywords Achievement Goal, Self-determination, Coach Observation, Training, Competition

Introduction

Within sport, there are two key settings in which a coach predominantly interacts with his/her athletes: i.e., training and competition. To date, few studies have sought to separately examine the coaching environment manifested in both training and competitive contexts. This is important, especially when considering the suggestion that coaches may emphasise and rely on more negative coaching strategies when placed under the pressure of competitive situations (Mageau & Vallerand, 2003). Two social-cognitive theories of motivation that identify both adaptive as well as maladaptive facets of the coaching environment are Achievement Goal Theory (AGT; Nicholls, 1989) and Self-determination Theory (SDT; Deci & Ryan, 2000).

Achievement Goal Theory

According to AGT (Ames, 1992; Nicholls, 1989), there are 2 major achievement goals an individual can differentially adopt. When individuals primarily adopt a task goal focus, they tend to define success according to self-referenced criteria such as exerted effort and this is associated with more adaptive consequences (Dweck & Leggett, 1988, 1999; Nicholls, 1989). If an individual has a predominant ego goal focus, he/she tends to define success in terms of other-referenced criteria such as demonstrating superior ability compared to relevant others, which is associated with more maladaptive patterns of achievement striving (Duda, 2005).

The motivational climate (Ames, 1992) created by a significant other, such as a coach, is assumed to impact upon whether an individual adopts a task and/or ego goal focus in a specific activity (Reinboth & Duda, 2006). AGT suggests that, when a coach creates an environment that places emphasis upon effort and improvement, cooperation, and ensuring all players have an important role (Newton, Duda & Yin, 2000), the climate is more task-involving. In contrast, a more ego-involving climate is created when the coach punishes

mistakes, encourages inter- or intra-team rivalry and focuses on superiority and normative comparisons (Newton et al., 2000). Previous research has demonstrated relationships between perceptions of a task-involving climate and a host of positive cognitive, affective and behavioural outcomes (see Duda & Balaguer, 2007). In contrast, a perceived ego-involving climate has been linked to more maladaptive responses (see Duda & Balaguer, 2007).

Self-determination Theory

SDT holds that the social environment created by a significant other, such as a coach, would impact upon athlete motivation via the satisfaction and/or thwarting of basic psychological needs for autonomy, competence and relatedness (Deci & Ryan, 2000). When the social environment created by a coach promotes a sense of autonomy, competence and relatedness athletes report more intrinsic and higher quality forms of motivation (Amorose & Anderson-Butcher, 2007). However, when the environment undermines need satisfaction and actively thwarts autonomy, competence and relatedness, athletes tend to report more controlled and lower quality forms of motivation (Pelletier, Fortier, Vallerand & Briere, 2001).

Within SDT, the social environment created by a significant other (e.g., a coach) is considered according to the extent to which it is autonomy supportive and controlling, interpersonally involved and hostile, and marked by structure and chaos (Skinner & Edge, 2002). When a coach is autonomy supportive he/she provides choices and options, encourages intrinsic interest and provides opportunities for athlete input (Adie, Duda & Ntoumanis,, 2008). In contrast, a controlling coaching environment is one that is coercive, power-assertive and intimidating (Bartholomew, Ntoumanis, Ryan & Thogersen-Ntoumani, 2011). When coaches are interpersonally involved or relatedness supportive[4], they are respectful, caring and take an interest in their athletes' lives (Mageau & Vallerand, 2003). A

[4] Different terminology exists in the literature with regards to interpersonal involvement and hostility. Based on Duda's (2013) conceptualisation, interpersonal involvement will be referred to as relatedness support and hostile environments will be considered relatedness thwarting.

hostile or relatedness thwarting coaching environment is created when a coach belittles athletes, stops the development of relationships and shows a lack of care and concern (Van den Berghe, Soenens, Vansteenkiste et al., 2013). Finally, a structured coaching environment is marked by clear expectations and guidance, while a chaotic environment is unclear, ambiguous and athletes are unsure of what is expected of them (Reeve, Jang, Carrell, Jeon & Batch, 2004).

In previous research, autonomy supportive coaching environments have been positively linked to athletes' basic psychological need satisfaction (Adie et al., 2008; 2012) as well as positive outcomes such as subjective vitality (Reinboth, Duda & Ntoumanis, 2004). Coach relatedness support has been shown to predict athletes' relatedness need satisfaction (Reinboth et al., 2004), while structure has been positively associated with athlete engagement (Curran, Hill & Niemiec, 2013). Controlling coaching environments have been associated with athletes' basic psychological need thwarting and more maladaptive responses such as higher levels of negative affect (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Bartholomew et al., 2011) and behavioural disaffection (Curran et al., 2013). Initial evidence suggests that relatedness thwarting coaching environments associate with lower levels of competence and relatedness need satisfaction (Smith, Tessier, Tzioumakis et al., in press).

A Theoretically Integrated and Multidimensional Motivational Coaching Environment

In previous research, dimensions of the environment proffered by AGT and SDT have been primarily considered independently (e.g., Adie et al., 2008; 2012; Newton et al., 2000). Recently, however, a theoretically integrated perspective on the motivational environment (Duda, 2013) has been advanced which encapsulates both AGT and SDT features of the motivational environment created by coaches.

Within the present study we draw from Duda's (2013) conceptualisation of the coach-created motivational environment as a hierarchical and multidimensional construct integrating motivationally relevant features of the environment as proffered in both AGT and SDT. According to Duda (2013), the motivational climate can be characterised according to a number of broad environment dimensions that capture key coaching practices considered as motivationally *'empowering'* and *'disempowering'*.

In an empowering motivational environment the coach promotes a feeling of athlete autonomy, relatedness and task-referenced perceptions of competence. These types of empowering environments are marked by autonomy supportive, relatedness supportive and task-involving features (Duda, 2013). In contrast, a disempowering motivational environment is assumed to thwart feelings of autonomy, relatedness and encourage ego-referenced perceptions of competence. This is because a disempowering environment is marked by controlling, relatedness thwarting and ego-involving behaviours. Although not explicitly included in Duda's (2013) conceptualisation, tenets proposed by SDT suggest the dimension of structure should promote athletes' perceptions of competence (Jang, Reeve & Deci, 2010), particularly if provided in an autonomy supportive and task-involving manner.

Previous research on the coach-created motivational environment drawing from AGT and/or SDT almost exclusively relied on self-reported assessments of the environment as completed by the athletes (Duda & Balaguer, 2007; Ntoumanis, 2012). To date, there have been limited attempts to objectively observe features of the coach-created motivational environment drawing from an AGT or SDT perspective (Boyce, Gano-Overway & Campbell, 2009; Webster, Wellborn, Hunt, LaFleche, Cribbs & Lineberger, 2013). Pulling from Duda's theoretically integrated approach to examining the motivational climate (2013), Smith et al., (in press) developed the Multidimensional Motivational Climate Observation System

(MMCOS) to assess dimensions of the coaching environment and also whether this environment is overall more or less *empowering* and *disempowering.*

Motivational Environments in Training and Competition

In general, studies assessing athletes' perceptions of the motivational environment from an AGT or SDT lens have tended to consider features emphasised by the coach at a more contextual level (not discriminating between training and competition) (e.g., Adie et al., 2008; Reinboth & Duda, 2006). An exception is work by van de Pol et al. (2011) who found (adult) athletes reported their coaches as creating a more ego-involving climate in more competitive settings when contrasted to the environment created during training.

To our knowledge, there is a dearth of AGT or SDT observational work examining potential differences in coaches' behaviors as a function of training versus competition. Using the Coaching Behavior Assessment System (CBAS; Smith, Smoll & Hunt, 1977), Chaumeton and Duda (1988) showed that compared to those performing at a lower level, higher performance athletes perceived coaches to emphasise more performance-oriented criteria.

Mageau and Vallerand (2003) also provide an explanation for the findings of van de Pol and colleagues (2011) and Chaumeton and Duda (1988) by suggesting, that under pressure, coaches will typically resort to a more controlling motivational style in an attempt to influence the outcome of the game or match. Recent research by Stebbings, Taylor and Spray (2011) supports this proposition and showed that when coaches perceived themselves to be under pressure they reported more controlled motivation regulations and this predicted their creating a less autonomy supportive and more controlling environment. However, in a more recent study no differences were found between autonomy support across training and match settings (van de Pol et al., 2015). Whether there are overt differences in the

multidimensional motivation environment emphasised by the coach across the two contexts remains to be tested.

Present Study

The overarching aim of the present research was to examine, from an AGT and SDT perspective, differences in the multidimensional coach-created motivational environment across training and competition in youth sport. Although initial research has employed the MMCOS to rate the motivational environment in training settings (Tessier, Smith, Tzioumakis et al., 2013), there are currently no studies that have employed the MMCOS to assess objective features of the motivational coaching environment manifested during competition. In the current study, we compare the motivational characteristics, in terms of the dimensions of the environment emphasized and motivational strategies used by youth football coaches in training and matches. We hypothesised that coaches would be less autonomy supportive and more controlling, be less task-involving and more ego-involving, and less relatedness supportive and more relatedness thwarting in competition compared to in training (Mageau & Vallerand, van der Pol et al., 2011). We provided no apriori hypothesis regarding the dimension of structure. Researchers have discussed how structure may be emphasised alongside other key dimensions of the motivational environment, such as autonomy support and control (Curran et al., 2013; Jang et al.,, 2010; Sierens Vansteenkiste,, Goossens, Soenens & Dochy et al., 2009). Therefore it is equally likely that structure could be more or less emphasised in competition compared to training.

Method

Participants

Seventeen (16 male and 1 female) UK-based grassroots soccer coaches were recruited to take part in the study. On average the coaches were 44.7 years old (*SD* = 2.83 years), had been coaching for 5.8 years (*SD* = 2.68 years) and been with their current team for 3 years.

Procedure

Teams who participated in the local grassroots soccer league were identified and contacted via email or telephone in the first instance. After demonstrating an interest in the project, coaches were provided an information letter detailing the study commitments. Following coach approval an information letter was administered to the athletes and their parents. Athletes were required to provide their own informed consent, however due their age parents (or legal guardian) were also given a 2-week period to opt their child out of the filming. No parents chose to withdraw their child from participating. When filming matches it was inevitable that the opposing coach and players would be captured by the camcorder and voice recording equipment. Potential opposition were contacted in advance of the recording sessions and informed about the purposes of the project. The opposition coaches were given an opportunity to inform their parents and athletes of planned filming and asked to contact the lead researcher in the event of any problems. None of the opposition teams, athletes or parents raised any concerns. All consent procedures were in line with ethical review recommendations offered by the authors' university review process.

As soon as possible after gaining consent, the lead researcher scheduled to visit and film the coach during a training session and a match. During both sessions, the researcher arrived at the location at least 10 minutes prior to the start of the session. The coach was recorded using a digital camcorder (JVC Everio GZ-EX310), voice recorder (Olympus VN-702) and lapel microphone (Olympus ME15). After the initial set up, the researcher stood in an unobtrusive position to the side of the training area (or pitch in the instance of a match). The coach was allowed to continue undisturbed until the end of the session and until all players had left the area. To reduce the likelihood of a Hawthorne effect (Adair, Sharpe & Huynh 1989) a researcher was in contact and visited the coach prior to filming. This ensured that coaches and athletes were familiar with a researcher's presence.

Measures

Observed Multidimensional Coach-Created Motivational Climate

Recordings of the coach in both training sessions and in matches were coded using the Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press). Each of the videos were split into four equal time-periods and coaches were rated according to the 32 lower order behavioural strategies, the potency of the 7 environmental dimensions (i.e., autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured) and overall according to 2 higher order factors (i.e., empowering and disempowering).

When making ratings, 2 coders worked independently following a marking scheme and coding sheet (coding materials available from first author on request). Throughout each quarter time-period, coders were asked to mark off the behavioral strategies as they were used by the coach. Similar to the checklist used by Boyce et al., (2009), the strategy ratings provided information on the absence/presence of each of the strategies rather than a frequency count (i.e., the strategies were only rated once). Within the MMCOS there are 6 strategies that inform whether the coach emphasized an autonomy supportive environment e.g., 'provides meaningful choices'; 6 strategies for the controlling dimension e.g., 'uses extrinsic rewards'; 4 strategies for the task-involving dimension e.g., 'emphasizes effort and improvement'; 3 strategies for the ego-involving dimension e.g., 'punishes mistakes'; 5 strategies for the relatedness supportive dimension e.g., 'ensures all players are included in drills, activities and exercises'; 5 strategies for the relatedness thwarting dimension e.g., 'belittles players'; and 3 strategies for the structure dimension e.g., provides guidance'.

At the end of each quarter, the coder was asked to rate the potency of each of the 7 environment dimensions. While the individual strategy ratings are made using a checklist approach (0 = not present; 1 = present), the potency rating for the higher order environment

dimensions are based on the observed frequency, intensity and pervasiveness of the behavioural strategies used by the coach and is rated using a 4-point potency scale ranging from 0 to 3 (0 – *not at all*; 1 – *weak potency*; 2 – *moderate potency*; 3 – *strong potency*). At the end of each video coders were asked to make a separate rating and consider the degree to which the coach was empowering by supporting autonomy, competence and task-referenced competence, or disempowering by thwarting autonomy, relatedness and encouraging ego-referenced perceptions of competence.

Initial research has supported the validity and reliability of the MMCOS in a team sport environment (Smith et al., in press). To determine the inter-observer reliability percentage agreement was calculated for the individual behavioural strategies, and 2-way random intra-class correlation coefficients were calculated for the environment dimensions and higher order factors. Percentage agreement is considered acceptable when surpassing the level of 85% as recommended by Siedentop (1976). To interpret the ICC the average measures I is reported and interpreted based on the cut points proposed by Portney and Watkins (2009). When the ICC smaller than 0.50, reliability is considered as poor; between 0.50 and 0.75 is moderate; and greater than 0.75 is good.

Coder Training

Three coders were recruited to rate the collected training and match recordings. Prior to being involved in the present study, the 3 coders had taken undergraduate courses centred on motivation and had covered both AGT and SDT in their studies. Furthermore, the coders had a good knowledge of soccer and experience of coaching in sport. To ensure a baseline level of understanding, a coder-training package was delivered to the 3 coders by the lead author following the same procedure reported by Smith et al., (in press). Before coding main footage coders were required to surpass an intraclass correlation coefficient of 0.70 for both inter- and intra-coder agreement.

Data Analysis

Overall ratings for each of the environment dimensions in both training and competition were computed by averaging the 2 coders' scores from each of the 4-quarters. Three multiple analyses of variance (MANOVA) were then conducted. In the first test empowering dimensions of the observed coaching environment (i.e., autonomy support, task-involving, relatedness support and structure) were included as dependent variables and context (i.e., training or match) was included as a fixed factor to explore the differences in the ratings across the 2 contexts. A second MANOVA was conducted using the same procedure replacing the dependent variables with the disempowering environment dimensions of controlling, ego-involving and relatedness thwarting. A final MANOVA was computed including the higher order ratings of empowering and disempowering as dependent variables.

Further MANOVA analyses were conducted to examine the behavioural strategies used during competition and training (see table 1 for breakdown). To begin, a sum was created for each of the behavioural strategies based on whether the strategy was or wasn't used by the coach (a maximum possible score of 4 was available, which indicates the coach was observed to use the strategy in each of the four quarters). After summing the strategy scores, groups of behavioural strategies (i.e., 6 autonomy supportive, 6 controlling strategies etc.) were inputted as dependent variables (a total of 7 MANOVAs were conducted based on the 7 environmental dimensions) and context identified as the fixed factor in the analysis.

Results

Results presented in table 1 suggest a moderate to good degree of reliability was evident across all of the rated environmental dimensions and higher order factors in both training (ICC range = 0.67 – 0.87 and matches (ICC range 0.85 – 0.93). While a number of the individual behavioural strategies were rated to an acceptable level of reliability (i.e., >85% agreement), 12 strategies in training and 14 strategies in matches fell below the 80%

agreement level (training range 69 – 100%/match range 62 – 100) (see table 1 for value breakdown).

Table 1

Descriptive statistics, reliability values and results of MANOVA analyses for all study variables

Observed Dimensions Observed Behavioural Strategies	Training		Match		
	Mean (SD)	ICC %	Mean (SD)	ICC %	Difference
Autonomy Support	1.45 (0.56)	0.81	0.82 (0.53)	0.90	0.63**
Acknowledges feelings and perspective	0.97 (1.32)	96	0.29 (0.85)	100	0.68+
Provides Meaningful Choice	2.29 (1.32)	82	1.50 (1.30)	83	0.79+
Encourages Intrinsic Interest	0.85 (1.06)	89	0.50 (0.61)	87	0.35
Provides Rationale for Tasks/Requests/Constraints	1.82 (1.33)	74	0.68 (0.97)	89	1.14**
Provides Opportunity for Player Input	1.82 (1.15)	82	0.97 (0.76)	79	0.85*
Encourages Initiative Taking	1.97 (1.44)	87	0.85 (0.90)	83	1.12*
Controlling	1.03 (0.61)	0.71	1.74 (0.54)	0.87	0.71**
Uses Extrinsic Rewards	0.15 (0.29)	96	0.27 (0.53)	93	0.12
Uses Controlling Language	3.21 (1.00)	80	3.71 (0.61)	88	0.50+
Relies on Intimidation	0.21 (0.40)	99	0.29 (0.56)	88	0.08
Demonstrates Negative Conditional Regard	0.91 (1.14)	87	0.85 (1.03)	78	0.06
Uses Overt Personal/Physical Control	1.15 (1.04)	78	2.29 (0.94)	62	1.14**
Devalues Athletes' Perspective	0.56 (0.73)	89	1.21 (1.02)	75	0.65*
Task-involving	2.00 (0.45)	0.67	1.52 (0.63)	0.89	0.48*
Emphasises Task-focused Competence Feedback	3.71 (0.47)	88	2.97 (1.15)	83	0.74*
Explains Player Role Importance	1.97 (1.18)	72	1.11 (1.07)	85	0.87*
Emphasises/Recognises Effort and/or Improvement	2.85 (1.25)	83	2.59 (1.09)	71	0.26
Uses Cooperative Learning	0.47 (0.67)	91	0.38 (0.55)	89	0.09
Ego-involving	0.74 (0.45)	0.75	1.04 (0.55)	0.93	0.30+
Punishes Mistakes	0.06 (0.17)	97	0.32 (0.98)	96	0.26
Emphasises/Recognises Inferior/Superior Performance and Ability	1.88 (1.21)	79	2.41 (1.30)	85	0.53
Encourages Inter-/Intra-team Rivalry	1.03 (1.24)	89	1.35 (0.86)	79	0.32
Relatedness Supportive	1.86 (0.54)	0.89	1.41 (0.44)	0.85	0.45*

Ensures Athletes are Included in Drills/Activities/Exercises	1.44 (1.10)	78	0.32 (0.50)	93	1.12**
Engages in Non-instructional Conversation with Athletes	2.18 (1.52)	88	1.03 (1.02)	83	1.15*
Adopts a Warm Communication Style	2.79 (1.16)	69	2.56 (1.45)	81	0.23
Shows Care and Concern for Athletes	2.24 (1.20)	71	2.06 (1.21)	71	0.18
Shows Unconditional Regard	2.41 (1.31)	77	1.44 (1.50)	75	0.97+
Relatedness Thwarting	0.31 (0.28)	0.87	1.16 (0.69)	0.95	0.85**
Excludes Athletes from Certain Drills/Activities/Exercises	0.18 (0.39)	100	0.12 (0.33)	100	0.06
Restricts Opportunities for Interactions and Conversation	0.59 (0.83)	94	0.24 (0.53)	91	0.35
Shows a Lack of Care and Concern for Athletes	0.24 (0.40)	88	0.32 (0.56)	87	0.08
Belittles (makes an attempt to embarrass) Athletes	0.47 (0.70)	94	1.26 (0.97)	83	0.79*
Adopts a Cold Communication Style	0.91 (1.24)	87	2.50 (1.44)	87	1.59**
Structure	2.26 (0.51)	0.87	1.65 (0.50)	0.89	0.61**
Provides Instructions and Organisation	3.79 (0.36)	89	2.59 (1.15)	88	1.20***
Offers Expectations for Learning	1.15 (1.51)	87	0.47 (1.04)	94	0.68
Provides Guidance Throughout Drills/Activities/Exercises	3.82 (0.39)	94	3.88 (0.33)	100	0.06
Empowering	1.97 (0.65)	0.87	1.41 (0.59)	0.87	0.56*
Disempowering	0.94 (0.67)	0.66	1.62 (0.63)	0.93	0.68**

Note: N Coaches = 17. * $p < 0.05$; ** $p < 0.01$; ***$p < 0.001$. ICC = Intra-class Correlation Coefficient, % = Percentage agreement.

The bivariate correlations between dimensions of the MMCOS can be seen in table 2. In general, the strength and direction of correlations are equivalent in both training (correlations in bottom left) and match settings (correlations in top right). Items considered empowering (i.e., autonomy support, task-involving, relatedness supportive and structure) were positively correlated with each other when rated in both training and matches. Furthermore, the empowering environment dimensions were also positively correlated with the higher order rating of an empowering environment in both contexts. A similar pattern was observed for the disempowering environment dimensions. Specifically, controlling, ego-involving and relatedness thwarting dimensions were positively correlated with each other in both training and matches, as well as being positively correlated with the higher order rating of a disempowering environment.

Results included within table 1 highlight significant differences between the potency of ratings in training and matches for both higher order factors (empowering and disempowering) and 6 out of 7 environmental dimensions.

At the higher order factor level analyses indicated a significant effect for context, Wilks' Lambda = 0.67, F = 7.82, df = (2, 31), p = .002. Coaches were observed to be significantly more empowering F = 7.48, df = (1, 32), p = .01 in training compared to the case in matches and significantly less disempowering F = 11.63, df = (1, 32), p = .002 in training compared to match situations.

At the environmental dimension, analyses highlighted significant effects for dimensions grouped as empowering, Wilks' Lambda = 0.68, F = 3.40, df = (4, 29), p = .021 and disempowering, Wilks' Lambda = 0.56, F = 7.75, df = (3, 30), p = .001. Figure 1 demonstrates the differences in the potency rating across contexts. Specifically, coaches more potently emphasised autonomy supportive F = 11.40, df = (1, 32), p = .002, task-involving F = 6.64, df = (1, 32), p = .015, relatedness supportive F = 7.10, df = (1, 32), p = .012, and

structured F = 12.58, df = (1, 32), p = .001 motivational environments during training compared to in matches. Coaches also created a significantly less potent controlling F = 13.02, df = (1, 32), p = .001 and relatedness thwarting F = 22.46, df = (1, 32), p < .001 environment in training compared to the case in matches. Although not significant, there was a trend for coaches to less potently emphasise ego-involving F = 3.09, df = (1, 32), p = .088 criteria in training compared to matches.

Table 2

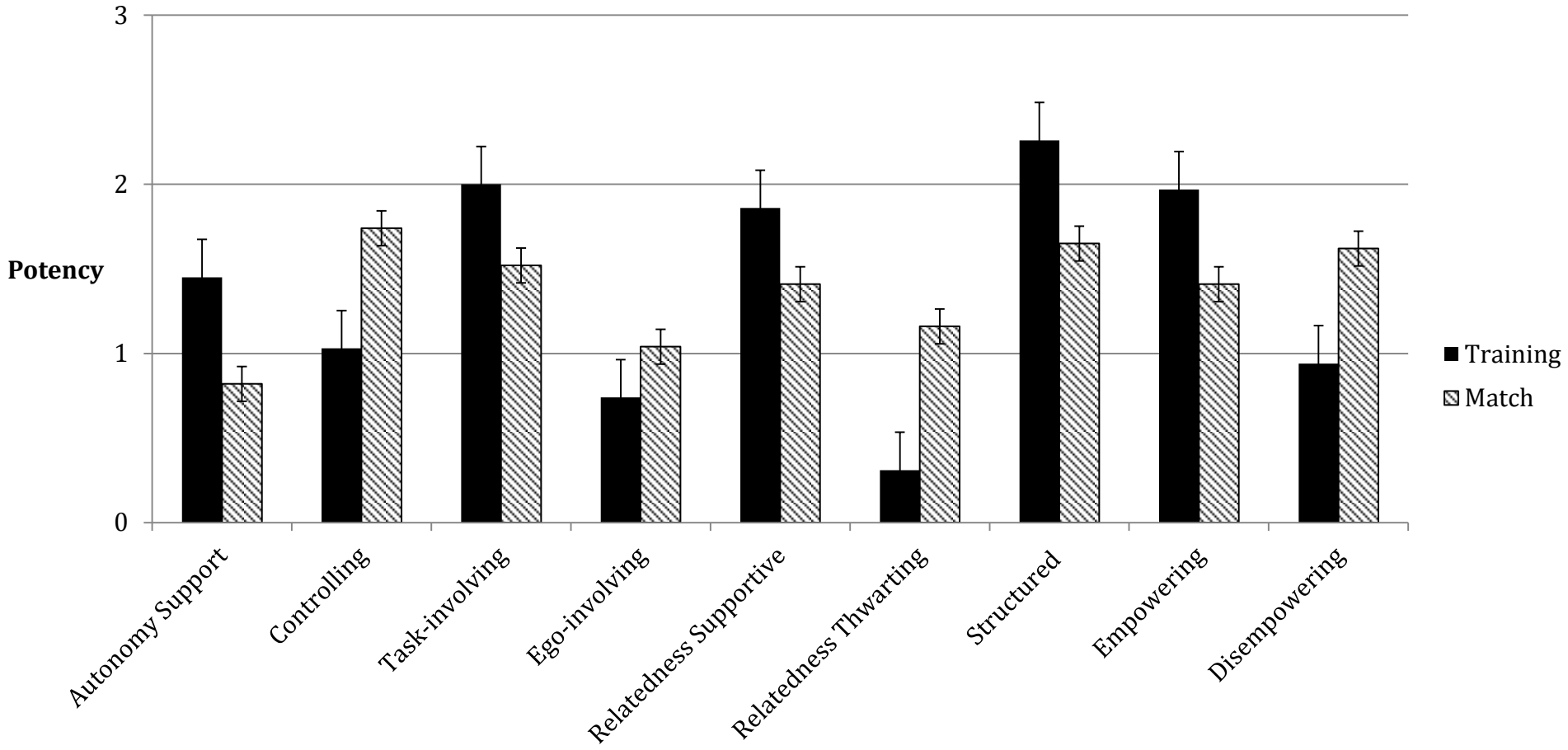
Bivariate correlation between dimensions of MMCOS rated in training and matches

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. AS	1	-0.51*	0.32	-0.21	0.33	-0.57*	0.76**	0.45	-0.41
2. CO	-0.48*	1	-0.56*	0.60*	-0.42	0.55*	-0.62**	-0.55*	0.65**
3. TI	0.67**	-0.27	1	-0.07	0.37	-0.26	0.61**	0.77**	-0.02
4. EI	0.04	0.47	0.27	1	-0.36	0.28	-0.20	-0.34	0.47
5. RS	0.59*	-0.41	0.47	0.17	1	-0.48	0.36	0.71**	-0.46
6. RT	-0.28	0.48*	-0.45	0.04	-0.51*	1	-0.52*	-0.50*	0.59*
7. ST	0.68**	-0.34	0.90**	0.26	0.47	-0.34	1	0.54*	-0.33
8. EMP	0.78**	-0.56*	0.71**	0.14	0.83**	-0.47	0.69**	1	-0.31
9. DISEMP	-0.20	0.37	0.15	0.54*	-0.10	0.48	0.11	-0.37*	1

Note: N Coaches = 17. Correlations to the bottom left indicative of ratings made during training, top right relates to ratings made in matches; * $p < 0.05$; ** $p < 0.01$. AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting, EMP = Overall Empowering, DISEMP = Overall Disempowering.

Figure 1

Graph to show differences in environment dimensions and higher order factors rated in training and matches



Note: Potency rating – 0 = not at all; 1 = weak; 2 = moderate; 3 = strong

Differences in the lower-order strategy use are presented in table 2. Significant effects were found for strategies across 6 out of the 7 environmental dimensions. In match scenarios coaches offered less rationale $F = 8.24$, $df = (1, 32)$, $p = .007$, provided fewer opportunities for input $F = 6.55$, $df = (1, 32)$, $p = .015$ and encouraged initiative taking $F = 7.37$, $df = (1, 32)$, $p = .011$ significantly less than in training. Coaches were observed to use significantly more overt control $F = 11.39$, $df = (1, 32)$, $p = .002$ and devalue athletes' perspective $F = 4.56$, $df = (1, 32)$, $p = .04$ in matches compared to training. In training, coaches provided more task-focused competence feedback $F = 5.94$, $df = (1, 32)$, $p = .021$ and explained player role importance $F = 4.89$, $df = (1, 32)$, $p = .034$. Coaches also ensured all players were included in drills and activities $F = 14.51$, $df = (1, 32)$, $p = .001$, and engaged in non-instructional conversation more in training compared to competition $F = 6.66$, $df = (1, 32)$, $p = .015$. Furthermore, coaches were observed to belittle $F = 7.53$, $df = (1, 32)$, $p = .01$ and adopt a cold communication style $F = 11.91$, $df = (1, 32)$, $p = .002$ more often in matches than in training. Finally, coaches provided more instruction and organisation $F = 17.09$, $df = (1, 32)$, $p < .001$ in training compared to matches.

Discussion

The purpose of the present study was to use the newly developed MMCOS (Smith et al., in press), which pulls from a theoretically integrated and multi-dimensional conceptualisation of the motivational environment (Duda, 2013), to rate and compare the objective coach-created motivational environment in training and match scenarios. Prior to this study no attempts have been made to compare the objectively-rated coaching environment in training and competition, specifically using an observational measure grounded in AGT and/or SDT. Furthermore, this is the first study to employ the MMCOS to rate the motivational coaching environment in a competitive team sport setting.

Results highlighted a moderate to good degree of reliability when using the MMCOS in both training and matches. Focusing on competitive situations, observers achieved a high degree of consistency between their ratings of the environmental dimensions (range = 0.87 – 0.95). This finding supports previous research examining the reliability of the MMCOS in practice settings (Smith et al., in press; Tessier et al., 2013) and provides further evidence for the inter-rater reliability of the measure.

The correlations between different dimensions of the MMCOS offer additional evidence for the construct validity of the measure. The present findings suggest that when a coach creates an empowering motivational climate by emphasising criteria such as autonomy support, they are likely to also be task-involving, relatedness supportive and provide structure. Similarly, when coaches emphasise disempowering criteria such as when they are controlling, they are also likely to communicate ego-involving and relatedness thwarting information. The strength and direction of correlations are similar to those reported in previous self-report research that examined dimensions of the coaching environment relevant to both AGT and SDT (Reinboth et al., 2004; Quested & Duda, 2010).

Coaches were observed to be more empowering and less disempowering in training compared to matches. This indicates that coaches were observed and rated as supporting athletes' basic psychological needs for autonomy, relatedness and promoting task-referenced perceptions of competence in training more potently than in match settings. During matches, coaches created an environment that was more likely to thwart athletes' basic needs for autonomy, relatedness, and promote ego-referenced perceptions of competence. These findings have consequences for athlete motivation. Empowering rather than disempowering motivational environments are expected to promote more autonomous forms of motivation (Duda, 2013), which have been shown to predict adaptive responses to sport including greater levels of enjoyment (Gagne & Blanchard, 2007) and persistence (Pelleteir et al., 2001).

Disempowering motivational environments have been show to predict more maladaptive responses such as higher levels of negative affect (Bartholomew et al., 2011) and intentions to dropout of sport (Sarrazin, Vallerand, Guillet, Pelletier & Cury, 2002). Future research to address the longer-term implications of creating empowering and disempowering environments in both contexts would provide a valuable extension to this work.

Findings from analyses at the environmental dimension level indicated that coaches created a more potent autonomy supportive, task-involving, relatedness supportive and structured environment in training compared to matches. Coaches also emphasised more controlling and relatedness thwarting criteria in matches compared to in training. For this group of coaches, it appears that they were creating rather distinctive motivational coaching environments in training and competition. Overall, the findings correspond to suggestions by Mageau and Vallerand (2003) and Duda (1992), as well as previous research by Stebbings et al., (2011) and van de pol et al., 2011, that coaches will rely on more controlling, ego-involving and disempowering criteria, when under the pressure of competitive settings.

At the lower-order strategy level the increased use of overt control, devaluing athletes' perspective, belittlement and cold communication observed during the present study suggest that coaches were trying to control and influence the game. This came at the expense of athletes' autonomy and relatedness and according to previous research is due to the coaches being under pressure themselves.

No significant differences were found for the potency of the ego-involving (or more performance-focused) dimension in training versus matches. Due to the young age of the athletes, and the competitive level they were performing at (i.e., grassroots), emphasis on ego-involving criteria may have been less emphasised by the coach (Smith et al., in press). Although the mean potency rating of the ego-involving dimension could be considered as weak, coaches did employ strategies that emphasised superior/inferior ability. Future research

should examine how overt strategies such as emphasising ability, are interpreted by athletes and the impact that has on their motivation as well as other responses such as self-esteem and fear of failure.

Within previous self-report studies researchers have typically asked athletes to consider the motivational environment at a more contextual level, grouping training and matches together within one questionnaire (Newton et al., 2000; Quested, Ntoumanis, Viladrich, et al., 2013). Current findings suggest that it is important to distinguish between the types of environment created in the two different contexts, particularly as the coach employs varied motivational strategies and creates a different environment across both settings. It is important to consider that coaches interact with their athletes in both situations therefore creating a consistent, optimal and more empowering environment in both settings is important when trying to promote more adaptive forms of motivation and maintain young athletes' interest to participate in sport (Duda, 2013; Quested et al., 2013). Based on the current findings, researchers might consider training programs (e.g., Duda, Quested, Haug et al., 2013) which help coaches create a more empowering and less disempowering environment in both training and match settings. Reflective practice could also be employed enabling coaches to identify the environment they create in training and matches and more effectively regulate their own behaviour (Knowles, Gilbourne, Borrie & Nevill, 2001). This is likely to be beneficial considering that coaches are often unaware of the environment they create for their athletes (Curtis, Smith & Smoll, 1979).

In forthcoming research it will be important to also consider, along with observed coach behaviors, athletes' responses such as their own perceptions of the environment, basic psychological needs and motivation. Findings from previous work suggests that overt controlling and relatedness thwarting dimensions of the environment created in training negatively predicted athletes' ratings of competence and relatedness need satisfaction in their

sport (Smith et al., in press). Whether these findings translate to competitive settings is still open for investigation.

A limitation of the present work revolves around the sample used and generalizability of the results. Within the current study coaches were from the UK and coached at a grassroots level. Future studies should examine training-competition differences in coach behaviours in more elite samples, including female athletes as well as various age groups. Previous studies have found differences in the environment created due to the age and competitive level of athletes therefore this would provide an important progression to the current findings (Chaumeton & Duda, 1988).

Conclusions

In summary, this is the first study to directly observe features of the coach-created motivational environment relevant to AGT and SDT in both training and match settings. Drawing from Duda's (2013) conceptualisation of the environment as a multi-dimensional construct and employing the newly developed MMCOS (Smith et al., in press), we found that coaches emphasised a less empowering and more disempowering motivational environment in competition compared to in training. Furthermore, there were differences in the specific strategies that coaches employed to 'motivate' their athletes in the two contexts. Overall, results provide further evidence for the construct validity, discriminant validity, and inter-coder reliability of the MMCOS. In addition, findings highlight the importance of considering the motivational coaching environment created in both training and matches.

CHAPTER 5.

EXAMINING THE PROFILE AND STABILITY OF THE OBJECTIVE AND PERCEIVED COACH-CREATED MULTIDIMENSIONAL ENVIRONMENT IN ACADEMY FOOTBALL

This manuscript is 'under review' at the *Psychology of Sport and Exercise*

Abstract

Objectives

Integrating concepts stemming from achievement goal theory and self determination theory, the motivational environment has recently been conceptualized as varying in its empowering and disempowering characteristics (Duda, 2013). To date, the majority of studies of the motivational environment has focused on youth/recreational sport. Moreover, research in this area has primarily considered perceptions of the motivational environment created by coaches. Extending the literature, the present study determined the profile and stability of and inter-relationships between observed and coach-perceived reports of empowering and disempowering dimensions of the coaching environments manifested in an elite football academy.

Design

A mixed method repeated assessment approach was adopted to address the objectives of the study.

Method

Five elite academy football coaches were recorded during 5 consecutive coaching sessions. Observed sessions were rated using the Multidimensional Motivational Climate Observation System. After each observed session, coaches reported on the environment manifested using the Empowering and Disempowering Motivational Climate Questionnaire-Coach.

Results

Findings highlighted 1) distinct profiles for observers' and coaches' reports, 2) weak associations between observers' and coaches' reports, and 3) stability in coaches' perceptions but not observers' ratings of the environment.

Conclusions

Overall, results support the use of multi-method assessments of the motivational environment and have implications for how academy coaches are trained to create more empowering and less disempowering environments for their athletes.

Introduction

Training within a sport academy system is often considered to be a fundamental step in the development of a professional athlete. Professional coaches working in this type of environment are often tasked with developing athletes' technical, physical, psychological and social skills, with the ultimate aim of maximizing performance (Treasure, Lemyre, Kuczka & Standage, 2007). Previous research would suggest that for coaches to foster athlete development within academy settings they should aim to create a motivationally adaptive training environment that emphasizes the importance of skill development, applying effort, taking responsibility and working as a team (Isoard-Gautheur, Guillet-Descas & Duda, 2013). To date, only a handful of studies have focused on the motivational environment created by coaches working within elite youth sport and the prevailing approach has been to tap athletes' perceptions of the climate manifested on their team (e.g., Adie, Duda & Ntoumanis, 2012; Isoard-Gautheur, Guillet-Descas & Duda, 2013). The present study adopts a multi-method approach (considering both observer reports and coach reports) to examine the motivational coaching environment manifested in academy football. We do this from the perspectives of two complimentary theories of motivation, namely achievement goal theory (AGT; Nicholls, 1989) and self-determination theory (SDT, Deci & Ryan, 2000).

The Motivational Environment from the Lens of both AGT and SDT

Over the past two decades researchers have discussed theoretical and empirical links between AGT and SDT (Deci & Ryan, 2000; Duda, 2013; Mageau & Vallerand, 2003; Ntoumanis, 2001) and studies have examined the concomitants of the coaching environment considering characteristics stemming from both theoretical perspectives (Reinboth, Duda & Ntoumanis, 2004; Smith et al., in press). Recently, Duda (2013) conceptualized the coach-created motivational environment as a hierarchical multidimensional construct comprised of relevant features of the environment that are emphasized within AGT and SDT. Her model

assumes that dimensions of coach behavior reflect the extent to which an environment can be considered more or less *'empowering'* and *'disempowering'*. In an empowering environment, a coach behaves in a manner that is likely to promote athletes' feelings of autonomy, relatedness and task-referenced perceptions of competence. As such, an empowering environment will be characterized by autonomy supportive, task-involving and relatedness supportive features and is associated with numerous adaptive cognitive, affective and behavioral responses within the sport domain (see Duda & Balaguer, 2007; Gagne & Blanchard, 2007). In contrast, when a coach is disempowering they behave in a manner that tends to thwart athletes' feelings of autonomy, competence and relatedness, as well as encouraging ego-referenced perceptions of competence. In a disempowering environment, the coach tends to engage in more controlling, ego-involving and relatedness compromising behaviours, which are associated with more maladaptive outcomes (Bartholomew, Ntoumanis & Thogersen-Ntoumani, 2010; Duda & Balaguer, 2007).

Observing the coaching environment based on an integrated theoretical perspective

In a recent extension to the literature, and drawing from the integrated conceptualization proposed by Duda (2013), a new observational measurement system has been developed to examine features of the coach-created motivational environment. The Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press) integrates principles from AGT and SDT to provide an objective rating of autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured dimensions of the environment. Although not explicitly incorporated in Duda's (2013) conceptualization, the dimension of structure was included within the MMCOS as studies grounded in SDT have found structure to positively predict athletes' basic psychological need satisfaction (Curran, Hill & Niemiec, 2013).

Recent research in youth grassroots soccer (Tessier et al., (2013) has employed the MCCOS to rate the behaviours of coaches working with young athletes between the ages of 9 and 14 years old. The study found grassroots coaches to create an environment that was low in potency across the 7 assessed dimensions of the motivational environment, which included autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structure. Ratings for all but the structure dimension were below the theoretical midpoint on the rating scale.

In contrast to grassroots coaches, we might expect academy level coaches to create an environment in which the features of the motivational climate are more potent. One aim of the objective profile of the autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured features of the environment as manifested by academy soccer coaches. Drawing from the coaching efficacy literature (Malete & Feltz, 2000), more elite coaches would be expected to have higher levels of self-efficacy. This might lead coaches to be more confident in their interactions with athletes and therefore would be predicted to create a moderate-to-strongly potent motivational environment. Findings from previous studies also suggest that, at higher competitive levels, coaches are perceived to employ more performance-oriented strategies (Chaumeton & Duda, 1988). Therefore, academy coaches would be expected to more potently emphasize disempowering rather than empowering dimensions of the environment. In the current study, we also tested this prediction in the case of comparing the potency of the autonomy supportive, task-involving, relatedness supportive and structured dimensions to the controlling, ego-involving and relatedness thwarting features of the objectively-rated motivational environment.

The findings of observational studies (e.g., Smith et al., under review) often create quite a different picture of the motivational quality of the coaching environment when

compared to research asking coaches to self-report the motivational environment they create. In a study by Stebbings, Taylor and Spray (2011), coaches with a range of experience (*M* = 11.12, *SD* = 10.02) and from different competitive backgrounds reported themselves high on autonomy support and low on controlling behavior. In a recent study examining the correspondence between observed and perceived reports of the motivational environment in youth sport, grassroots soccer coaches also reported creating a highly empowering environment marked by few disempowering features (Smith et al., under review). Ntoumanis (2012) suggests that coaches (and teachers) may be overly positive when rating themselves, which could explain the weak relationships often found between observed and perceived reports of the grassroots sport environment (Curtis et al., 1979; Smith et al., under review). Associations between observed and perceived ratings of the motivational environment are yet to be examined in elite youth sport settings. However, findings from pedagogical studies suggest that the desired and actual environments created by elite coaches are markedly different (Partington & Cushion, 2011). In the present study, we were also interested in the profile of coaches' ratings of their own autonomy supportive, controlling, task-involving, ego-involving and relatedness supportive behaviour, as well as the relationship to more objective ratings of the motivational environment.

Stability of the motivational environment

Past research suggests that situational level factors, such as the motivational coaching environment, influence athletes' situational-level motivation via the satisfaction of autonomy, competence and relatedness, which then facilitates more autonomous forms of motivation at the contextual level (Vallerand, 2007). Findings from diary studies indicate that there is day-to-day variability in the motivational environment emphasized by the coach (or teacher), which has implications for athletes' perceptions of the environment and ensuing motivation (Gagne, Ryan & Bargman, 2003; Quested, Duda, Ntoumanis & Maxwell, 2013).

Although studies have employed day-to-day ratings of empowering and disempowering features of the coaching environment (Gagne et al., 2003; Quested et al.,2013), these are almost exclusively based on athletes' self-reports of that environment. There is currently no research examining the stability of the coach-created motivational environment (as conceptualized via AGT and/or SDT and Duda's 2013 model) utilizing more objective methods (i.e., observations) along with considering coaches views of the environment(s) they create. Diary studies utilizing different methodological approaches may help explain the lack of congruence often found between observed and coach (or teacher) perceived dimensions of the motivational coaching environment mentioned previously (Curtis, Smith & Smoll, 1979; Smith et al., under review).

Although not specifically grounded in AGT or SDT, Smith, Shoda, Cumming and Smoll (2009) observed the behavior of youth baseball coaches in relation to whether they were winning, losing or drawing. Using the Coaching Behavior Assessment System (CBAS, Smith, Smoll & Hunt, 1977), Smith et al., (2009) found that coaches displayed a predictable behavioral profile according to the score of the game, suggesting that such situational dynamics induce a change in their behavior. Within the academy-coaching environment, it is likely that coaches realize a number of pressures and competitive demands (e.g., administrative, parental etc.) that could impact upon the environment they create for their athletes in any one particular training or competition. A final aim of the present study was to examine the stability of the objectively-rated and coach-reported empowering and disempowering dimensions of the environment over a series of consecutive coaching sessions.

Based on previous findings, we would expect to observe variability in the objectively-rated coach-created motivational environment when examined at the academy level. However the coach-perceived environment is likely to be more stable. Keegan, Spray, Harwood and

Lavallee (2011) suggest that when coaches (or athletes) are asked to reflect on the situational coaching environment they create, they are likely to draw from previous experiences as well as dispositional factors, such as their own motivational orientations, to inform their rating decisions. A similar explanation has been given when comparing observed and perceived features of the motivational environment in education settings (Van den Berghe et al., 2013). Haerens et al., (2013) suggest that when completing situational level measures, individuals may still take into account more general perceptions of the environment they tend to create. This is one explanation for the lack of agreement often found between more objective ratings and subjectively reported features of the coaching environment (Smith et al., under review).

Objectives

In sum, the first objective of the present research was to establish a profile of the motivational environment created by coaches in an elite academy football setting and compare the potency of the observed empowering and disempowering dimensions of the environment. It was hypothesized that coaches would shape a moderate-to-strong motivational coaching environment across the 7 observed dimensions. We predicted that coaches working in the academy environment would exhibit more potently objectively-rated disempowering (i.e., controlling, relatedness thwarting and ego-involving criteria) compared to objectively-rated empowering (i.e., autonomy supportive, task-involving, relatedness supportive, structured) dimensions of the coaching environment.

A second aim was to determine the profile of the coach-reported environment dimensions and compare the potency of the empowering and disempowering features of that environment. We then examined the relationship between the observed and perceived dimensions of the coach-created environment in this the academy football setting. Coaches were expected to report creating a significantly more empowering versus disempowering

environment. Weak associations between observed and perceived assessments on the same dimensions of the environment were expected to emerge.

A third purpose was to examine the stability of the observed and perceived multidimensional coach-created motivational environment on a session-by-session basis. Drawing from the body of evidence available (Smith et al., 2009), we hypothesised there would be variability in the potency of the objectively-rated coaching environment dimensions (i.e., autonomy support, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured) rated across the 5 academy soccer training sessions. In comparison, we expected that the coach-perceived dimensions of the environment (i.e., autonomy support, controlling, task-involving, ego-involving, relatedness support) would be relatively more stable across the 5 assessed sessions.

Method

Participants

Participants were 5 elite football coaches currently employed by a professional Premier League football club in the UK. All of the coaches held a UEFA B license qualification and worked with academy athletes between the ages of 12 and 14 years old. On average, the coaches were 29.72 years old (*SD* = 4.55 years) and had been coaching football for 7.82 years (*SD* = 3.92 years). Prior to participating in the study coaches, the club, and the young athletes (and their parents) provided consent to take part in study.

Procedure

After gaining ethical approval for the study, a professional football club local to the university was approached via an existing contact. After demonstrating an interest in being involved in the project, information letters and consent forms were given to the 5 academy coaches. Once coaches had confirmed their involvement they forwarded information letters and consent forms to the parents of the athletes involved in their respective teams. Parents

were given a 2-week time window to opt their child out of the filming if they wished. No parents chose to opt their child out of the filming. Athletes were asked to complete a signed consent form on the first day of filming.

Over the course of 5 consecutive coaching sessions, coaches were recorded using a camcorder ((JVC Everio GZ-EX310), digital voice recorder (Olympus VN-702) and microphone (Olympus ME15). On the day of filming a researcher arrived at the training complex 10 minutes before the start of the coaching session. The microphone was attached to the coach's collar and the camcorder was set up at the side of the training pitch. After the initial set up, coaches continued until the end of the training session undisturbed. After each of the filming sessions, coaches were asked to complete a brief questionnaire that included items related to the environment they create for their athletes.

Measures

Observed Multidimensional Motivational Climate Recordings of the coach were coded using the Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press). The MMCOS provides a system for rating key dimensions of the coach-created motivational environment drawing from both AGT and SDT. Coaches were rated according to the potency of 7 environmental dimensions, namely the extent to which they were autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured. When making the ratings, independent coders were instructed to follow a marking scheme and given a list of 32 behavioral strategies that are indicative of each of the 7 environmental dimensions (coding materials available from first author on request). Based on the frequency, intensity and pervasiveness of the behavioral strategies, coders rated the 7 dimensions on a 4-point potency scale ranging from 0 to 3 (0 – not at all; 1 – weak potency; 2 – moderate potency; 3 – strong potency). Within the MMCOS there are 6 strategies that inform whether the coach emphasized an autonomy supportive

environment e.g., ‘provides meaningful choices’; 6 strategies for the controlling dimension e.g., ‘uses extrinsic rewards’; 4 strategies for the task-involving dimension e.g., ‘emphasizes effort and improvement’; 3 strategies for the ego-involving dimension e.g., ‘punishes mistakes’; and 5 strategies for the relatedness supportive dimension e.g., ‘ensures all athletes are included in drills, activities and exercises’. Initial research has supported the validity and reliability of the MMCOS in a team sport environment (Smith et al., in press). Intra-class correlation coefficients were used to determine the reliability of each of the environment dimensions. Based on the cut points proposed by Portney and Watkins (2009), all 7 dimensions of the environment were coded to a good degree of reliability (see table 1).

Coder Training Following the data collection phase, two trained observers independently coded the footage. To begin, observers participated in a coder-training program to establish a baseline level of inter- and intra-rater reliability. To complete the training process, coders were required to meet an acceptable level of reliability established by an intra-class correlation coefficient of at least 0.70. To confirm this level of reliability was met, 2 full pilot videos were coded independently and compared to a ‘gold standard’ rating by the lead researcher. To establish intra-rater reliability, these videos were coded again after a 2-week break. After meeting an acceptable level of reliability coders were asked to rate the footage collected as part of the study. In total, the coder-training package included around 6 hours of PowerPoint slides, interactive seminars, and collaborative coding sessions that ensured the coders were well versed in how to use the measurement system. This training program has previously been used to train coders to rate the environment to a good degree of reliability (Smith et al., in press). In total, 25 training sessions and over 2250 minutes of video footage were coded during the project. Each video was split into 4 equal quarters, which allowed videos of different lengths to be compared.

Coach Perceived Multidimensional Motivational Climate To capture coaches' perceptions of the multidimensional coaching environment an adapted version of the Empowering and Disempowering Motivational Climate Questionnaire-Coach (Appleton et al., under review) was used. The EDMCQ-C scale is a 30-item measure designed assessing the extent to which athletes perceive the coaching environment to be autonomy supportive, controlling, task-involving, ego-involving and socially supportive.

When completing the questionnaire, coaches were asked to respond to modified questions using the stem, "In today's session…" and rate their answer on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Autonomy support was examined using 5 items e.g., "I gave my players choices and options". Seven items were used to tap into the extent to which coaches perceived themselves to be controlling e.g., "I mainly used rewards/praise to make players complete all the tasks I set during the session". There were 9 items used to examine task-involving dimensions of the coaching environment and 7 items related to ego-involving features of the environment. An example of a task-involving item included "I acknowledge players who tried hard" and an ego-involving item included "I had my favorite players". Finally, 3 items were utilized to capture the coaches' perceptions of providing social support e.g., I could really be counted on to care, no matter what happened". Scales for autonomy support, controlling, task-involving and ego-involving surpassed the acceptable level of reliability (see table 1). The subscale for social support was 0.54 and below the typically accepted level of 0.70 (Nunnally, 1978). However, scales that contain few items are more likely to be marked by lower reliability coefficients (Whitley & Kite, 2012).

Data Analysis

To address the first aim of the research, the profile of the coaching environment was examined by calculating the mean and standard deviations of the 25 observed sessions as a whole. A series of 12 paired samples t-tests were conducted to compare the potency of the

observed empowering and disempowering environment dimensions. To reduce the chance of type I error, the Bonferroni correction was applied and a modified *p* value (0.05/12 = 0.004) estimated to establish whether differences could be considered significant.

For aim 2, the profile of the coach-reported environment was established by calculating the mean and standard deviations of the 25 observed sessions as a whole. A series of 6 paired sample t-tests were conducted to compare coach-reported empowering and disempowering dimensions of the environment. Similar to aim 1, the Bonferroni correction was applied and a modified *p* value (0.05/6 = 0.008) was estimated to determine significance. Pearson correlations were then calculated to examine the associations between observed and coach-reported dimensions of the environment.

To examine the extent to which the coaching environment was stable (i.e., aim 3), the analysis was approached according to a single subject design (Hanton & Jones, 1999). Due to the constraints of working in a Premier League football club and access to coaches of interest to this study, the resulting sample size was small (albeit resulting in more than 2250 minutes of footage). This meant that typical parametric and non-parametric analyses to establish stability were not possible. To analyze the present data, individual data points for each of the coaches were retained (table 2) and examined according to criteria used in single-subject design. There are a number of guidelines available to researchers when interpreting single subject type data. The first is the degree of change between each of the data points. This provides an indication of the extent to which the assessed environment dimensions changed between sessions. While we acknowledge the subjective nature of this type of inspection, there are criteria and guidelines available to researchers adopting this approach (Horner, Carr, Halle et al., 2005). To determine whether changes were significant, a threshold of 10% was identified (> 0.40 for observer; > 0.50 for perceived) and has been used by other researchers in the past (Horner et al., 2005). This threshold has also been employed to examine changes

in the observed motivational teaching environment in physical education settings (Tessier, Sarrazin & Ntoumanis, 2010).

Results

Table 1 includes descriptive statistics from the study. Correlational data indicate that for the observations, empowering dimensions were positively correlated with other empowering dimensions and negatively correlated with disempowering dimensions. The same was true for the observed disempowering dimensions, which were positively correlated with other disempowering features and negatively correlated with empowering dimensions. A similarly consistent pattern of relationships was found between empowering and disempowering features when coaches reported on the environment they create.

Table 1

Descriptive statistics, reliability and bivariate correlations

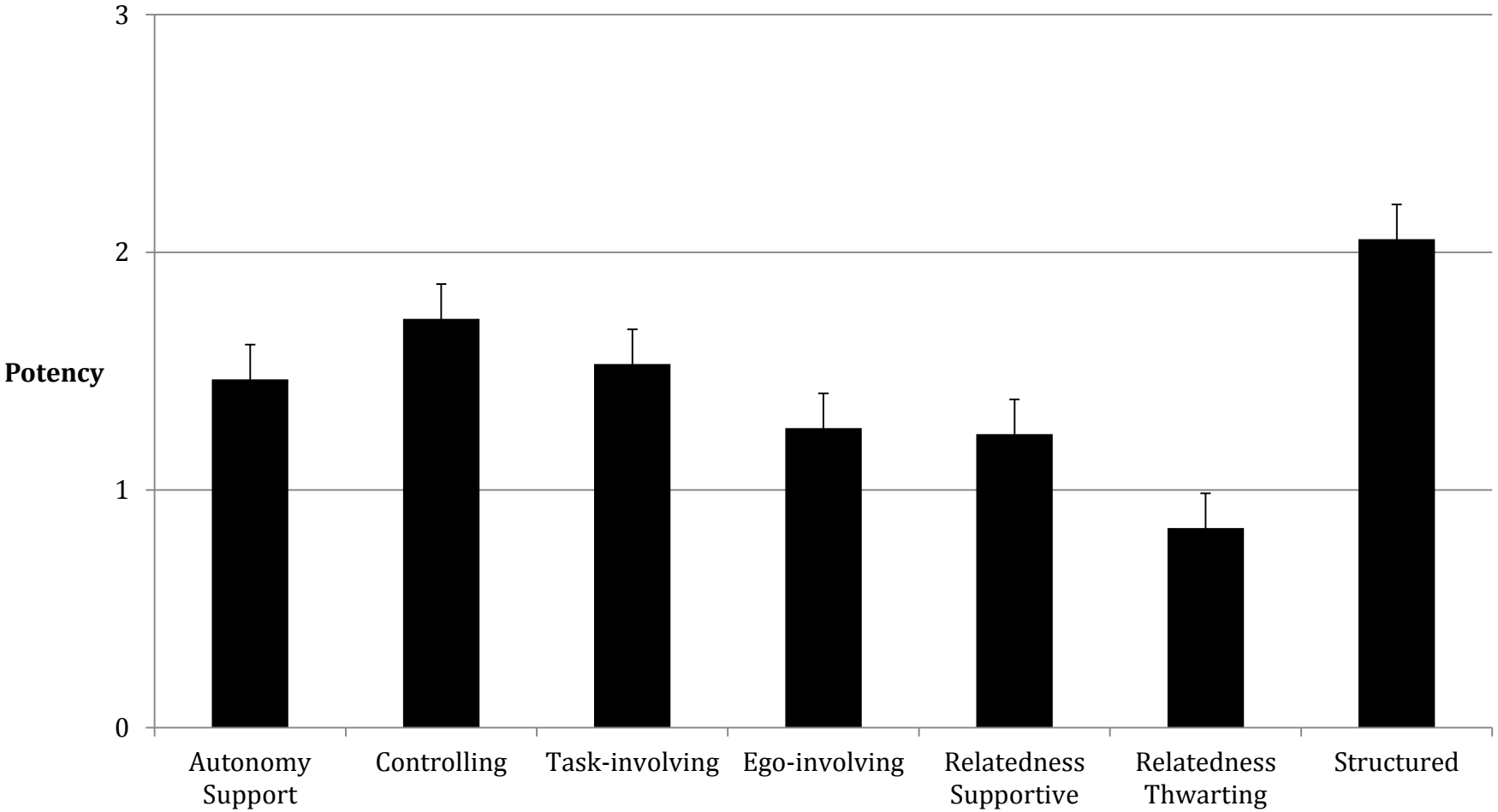
	Mean (SD)	Range	ICC / α	1	2	3	4	5	6	7	8	9	10	11
1 O_AS	1.47 (0.54)	0.50*	0.94	1										
2 O_CO	1.72 (0.49)	0.47*	0.92	-0.18	1									
3 O_TI	1.53 (0.49)	0.95*	0.93	0.50**	-0.06	1								
4 O_EI	1.26 (0.58)	0.75*	0.94	0.15	0.51**	0.05	1							
5 O_RS	1.24 (0.40)	0.50*	0.93	0.17	-0.31*	0.45**	-0.40**	1						
6 O_RT	0.84 (0.56)	0.52*	0.94	-0.02	0.40*	-0.35*	0.49**	-0.64**	1					
7 O_ST	2.06(0.36)	0.50*	0.91	0.30	0.15	0.56**	0.04	0.35*	-0.17	1				
8 C_AS	4.33 (0.59)	0.16	0.88	0.12	-0.04	-0.12	-0.25	0.17	0.34	-0.07	1			
9 C_CO	2.03 (0.78)	0.30	0.87	-0.52**	0.22	-0.10	0.28	0.02	-0.14	-0.12	-0.65**	1		
10 C_TI	4.37 (0.50)	0.20	0.87	-0.04	0.14	-0.16	-0.25	0.31	0.22	-0.08	0.90**	-0.53**	1	
11 C_EI	1.70 (0.89)	0.20	0.93	-0.45*	0.18	-0.01	0.29	-0.03	0.05	-0.22	-0.58**	0.89**	-0.51**	1
12 C_RS	4.61 (0.45)	0.33	0.54	0.35	-0.29	-0.06	-0.36	0.13	0.26	-0.05	0.76**	-0.77**	0.68**	-0.63**

Note: *N* Coaches = 5. * $p < 0.05$, ** $p < 0.01$. Range = Range in score sessions 1 – 5. O = Observations, C = Coach Perceptions. AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting

The observed profile of the motivational coaching environment can be seen in figure 1. The most potently emphasized dimension of the motivational environment was structure (M = 2.06, SD = 0.36) followed by controlling (M = 1.72, SD = 0.54) coaching. The least potently emphasized dimension of the environment was relatedness thwarting (M = 0.84, SD = 0.56). Overall, the environment dimensions were rated as weak-to-moderate with only three of the dimensions surpassing the theoretical midpoint (i.e., 1.5) of the scale (structure, task-involving and controlling). Contrary to our predictions, disempowering features of the environment were generally observed to be less potent than empowering features. The only exception was for the controlling dimension which was emphasized significantly more potently than relatedness support, $t(24) = 4.35$, $p < 0.001$. The relatedness thwarting dimension was emphasized significantly less potently than the autonomy supportive $t(24) = 3.99$, $p = 0.001$, task-involving $t(24) = 4.16$, $p < 0.001$ and structured $t(24) = 8.50$, $p < 0.001$ dimensions of the environment. In addition, the controlling $t(24) = 3.29$, $p = 0.003$ and ego-involving $t(24) = 6.28$, $p < 0.001$ dimensions were emphasized significantly less potently than the structure dimension.

Figure 1

Observed profile of the coach-created motivational environment

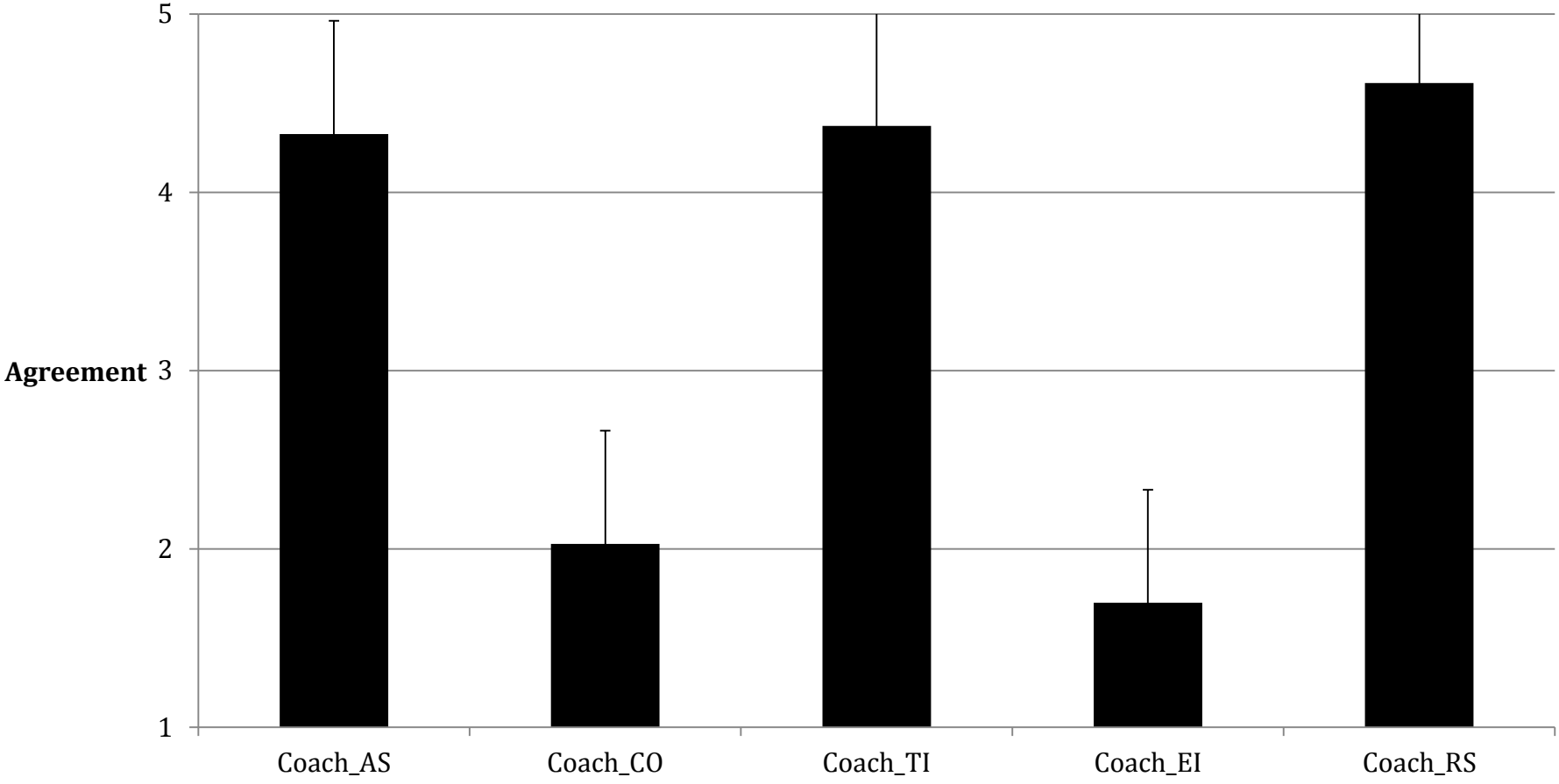


Note: Potency = 0 – not at all, 1 – weak, 2 – moderate, 3 - strong

The profile of the coach-reported motivational environment can be seen in figure 2. Coaches strongly agreed that they created an autonomy supportive (M = 1.67, SD = 0.59), task-involving (M = 1.63, SD = 0.50) and relatedness supportive (M = 1.39, SD = 0.45) environment, as well as disagreeing that they employed controlling (M = 3.95, SD = 0.78) and ego-involving (M = 4.30, SD = 0.89) behaviors. In line with our hypotheses, paired samples t-tests indicated that coaches reported the environment as significantly more autonomy supportive, task-involving and relatedness supportive than controlling ($t(24)$ = 9.19, $p < 0.001$; $t(24) = 10.32$, $p < 0.001$; $t(24) = 11.08$, $p < 0.001$) and ego-involving ($t(24)$ = 9.98, $p < 0.001$; $t(24) = 10.94$, $p < 0.001$; $t(24) = 11.92$, $p < 0.001$) respectively. Pearson correlations were computed to examine the relationship between the observed and coach-perceived dimensions of the environment (see table 1). The autonomy supportive (r = 0.12), controlling (r = 0.22), ego-involving (r = 0.29) and relatedness supportive (r = 0.13) dimensions were found to be weak but positively correlated. There was a weak negative relationship between observed and coach-perceived reports on the task-involving (r = -0.16) dimension.

Figure 2

Coach-perceived profile of the motivational environment



Note: Agreement = 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree. Coach = Coach Perceptions. AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting

To explore stability of the motivational environment individual data points for the observed and perceived dimensions of the environment were examined across the 5 observed sessions and are reported in table 2. Coaches 2, 3, 4 and 5 were observed to emphasize a significantly different environment for each of the 7 dimensions of the environment as rated by the MMCOS over the course of the 5 observed sessions. Coach 1 created a varied motivational environment for 5 of the 7 dimensions (i.e., change > 0.40), however was observed to create a less varied and more stable autonomy supportive and structured environment over the 5 sessions.

In comparison to the observational data, coach-perceived reports of the environment suggest a greater degree of stability. Reports made by coach 1 indicate stability across the 5 sessions (Range < 0.50) on 4 out 5 dimensions, with the exception of the controlling dimension. Coach 2 also reported a stable environment for 4 out of 5 dimensions, however did reveal a significant degree of variability in their level of relatedness support. For coach 3, there was a significant degree of variability reported on the autonomy support and relatedness support dimensions. Coach 4 revealed the least stable environment, and their reports revealed significant differences for 4 out of 5 dimensions, with stability only reported for the ego-involving dimension. Finally, an examination of coach 5's data suggested stable perceptions of the environment across 4 out of 5 dimensions, with significant variability only observed for the ego-involving dimension.

Table 2

Session-by-session ratings for individual coaches on observed and coach-perceived dimensions of the environment

Coach	Session	C_AS	C_CO	C_TI	C_EI	C_RS	O_AS	O_CO	O_TI	O_EI	O_RS	O_RT	O_ST
1	1	4.6	1.3	4.78	1.29	5	1.25	1.38	1.75	0.25	1.5	0.88	1.88
	2	5	1.6	4.78	1.43	5	1.38	2	1.5	0.38	2	0.13	2
	3	5	1.4	5	1	5	1.38	2.25	1.5	1	0.75	1.25	2.25
	4	5	2.1	5	1.29	5	1.25	2.13	1.13	1.25	1	1.75	2.25
	5	5	2	5	1.29	5	1	1.63	0.5	1.13	1.63	1.25	2.13
	Range	0.4	0.8*	0.22	0.43	0	0.38	0.87*	1.25*	1*	1.25*	1.62*	0.37
2	1	3.6	1.8	3.89	1.57	4.67	2	2.63	2.38	2.13	1.5	0.75	2.5
	2	4	2	4.22	1.14	4	1	1.88	1.75	0.5	1	0	2.25
	3	3.6	2.3	4	1.43	4	1.5	2.38	1.75	1.25	1.5	0.25	2.5
	4	4	2.3	4.22	1.29	4.33	0.88	2	1.38	2	1.25	0.13	2.38
	5	4	2.1	4.11	1.14	4.33	1.75	1.5	0.63	1	1.25	0.5	1.5
	Range	0.4	0.5	0.33	0.43	0.67*	1.12*	1.13*	1.75*	1.63*	0.5*	0.75*	1*
3	1	3.6	3.6	3.89	3.57	4	0.63	1.75	1.13	0.75	1.5	0.13	1.75
	2	4	3.2	4	3.43	4	1.25	2.25	1.38	2	1.25	1.38	2
	3	3.4	3.4	3.67	3.14	4	0.63	1.5	1.63	1.25	1	0.63	1.38
	4	3.8	3.7	4	3.43	3.67	1.25	2	2	2.25	1.25	1	2.38
	5	3.6	3.3	4	3.29	4.67	1.25	1.5	1.38	1.38	1.13	0.88	1.88
	Range	0.6*	0.5	0.33	0.43	1*	0.62*	0.75*	0.87*	1.5*	0.5*	1.25*	1*
4	1	4.4	1.9	3.67	1.43	4.67	2.38	1.25	2.38	1	1.25	0.88	2.63
	2	4	1.2	4.22	1.14	5	2.13	0.88	1.88	0.75	1.5	0.25	2.5
	3	4.4	1.6	4.22	1.43	4.33	1.63	1.63	1.5	2.5	0.5	1.75	2
	4	3.8	1.4	3.78	1.43	4.67	2.38	1.5	1.38	1.5	0.5	1.38	2.25
	5	4.4	1.5	4	1.14	5	1.5	0.38	1	0.88	0.5	1	1.5
	Range	0.6*	0.7*	0.55*	0.29	0.67*	0.88*	1.25*	1.38*	1.75*	1*	1.5*	1.13*
5	1	5	1.4	5	1	5	2.5	1.88	2.13	1.63	1.88	0.25	2

2	5	1.4	5	1	5	2.25	1.38	2.25	0.88	1.75	0.5	2.38
3	5	1.4	5	1	5	1.13	1.75	1.5	1.13	1.38	1	2
4	5	1.4	5	1	5	1.25	1.5	1	1.25	1.13	1.25	1.5
5	5	1.4	4.89	2.14	5	1.13	2.13	1.5	1.5	1	1.88	1.63
Range	0	0	0.11	1.14*	0	1.37*	0.75*	1.25*	0.75*	0.88*	1.63*	0.88*

Note: N Coaches = 5. * denotes significance as > 10% change. O = Observations, C = Coach Perceptions. AS = Autonomy Support, TI = Task-involving, RS = Relatedness Support, ST = Structure, CO = Controlling, EI = Ego-involving, RT = Relatedness Thwarting.

Discussion

As more limited work has been conducted on the coach climate manifested in more elite youth sport settings, an overarching focus of the present study was to examine the multidimensional motivational coaching environment manifested in elite academy football. We did this based on Duda's (2013) integrated conceptualization of the motivational climate from an AGT (Nicholls, 1989) and SDT (Deci & Ryan, 2000) perspective, which includes autonomy supportive, controlling, task-involving, ego-involving, relatedness supportive, relatedness thwarting and structured dimensions of the environment. Examining dimensions of the environment stemming from AGT and SDT, we first focused on determining the profile of the observed motivational environment created by professional soccer coaches (i.e., observations secured by recently developed MMCOS). After establishing the profile, differences in the potency of observed empowering and disempowering features emphasized by coaches were analysed. Second, we established the profile and compared empowering and disempowering dimensions of the coach-reported motivational environment. We then examined the relationship between observed and perceived environment dimensions. Thirdly, we tested the stability of the observed and coach-perceived empowering and disempowering dimensions of the environment across multiple coaching sessions.

Coaches were observed to exhibit a variety of coaching behaviours in an attempt to 'motivate' their athletes. In line with our hypothesis, the elite coaches in this study were observed to create a moderately potent motivational environment, on both empowering and disempowering dimensions. The most potently emphasized dimension of the motivational environment was structure. This is promising given past research using observational and self-report methodology has found structure to positively predict a number of adaptive responses including competence and relatedness need satisfaction (Smith et al., in press) as well as higher levels of engagement in sport (Curran et al., 2013).

In addition to structure, coaches were also observed to emphasize a moderately potent autonomy supportive and task-involving environment. This suggests that the elite coaches observed did encourage athletes to have input, make choices and take ownership over their participation, whilst also acknowledging the importance of effort, improvement and task-mastery. In the past, autonomy supportive and task-involving climates have been found to predict adaptive responses to sport. A positive relationship between objectively-rated autonomy support and autonomy need satisfaction was reported by Smith et al., (in press) in their work in grassroots soccer. In a following study, Smith and colleagues (under review) also found a positive association between observed task-involving coaching and young athletes' reports of more autonomous motivation.

Although the present sample of coaches were observed to potently emphasize empowering motivational strategies, they also utilized more disempowering motivational techniques and employed controlling and ego-involving features. When coaches are controlling, they rely on extrinsic rewards and use coercive strategies to control their athletes' behavior (Bartholomew et al., 2010). Aligned with SDT (Deci & Ryan, 2000) and as revealed in previous sport research, controlling motivational environments, assessed via observations as well as athletes' self-reports, have been associated with reduced psychological need satisfaction (Smith et al., in press), psychological need thwarting (Bartholomew et al., 2010) and more extrinsic forms of motivation (Smith et al., under review). Environments that undermine athletes' psychological needs and promote more extrinsic forms of motivation are related to maladaptive cognitive, affect and behavioral responses and are unlikely to lead athletes to develop optimally and achieve higher levels of performance (Duda, 1992).

The weak-to-more moderately potent use of ego-involving motivational strategies by the elite coaches is not surprising. In a previous observational study using the CBAS,

Chaumeton and Duda (1988) found that at higher performance levels coaches were perceived to rely on more punitive, performance-oriented behaviours. It is possible that the pressurized academy environment and emphasis placed on getting immediate results, leads coaches to employ more normative and other-referenced criteria for success. In the past ego-involving motivational climates have been linked to more maladaptive consequences such as self-handicapping (Ryska, Yin & Boyd, 1999) and an increased likelihood of burnout (Isoard-Gauther et al., 2013), and are unlikely to foster the long-term commitment needed for athletes to achieve higher levels of performance in their sport (Duda & Balaguer, 2007).

Interestingly, and in line with previous findings frosport (Smith et al., under review; Stebbings et al., 2011) and education domains (Taylor & Ntoumanis, 2007), coaches reported themselves as creating a highly empowering environment and using relatively few disempowering motivational strategies. This provides further evidence to suggest that coaches are overly positive when rating the environment they create for their athletes. This is possibly reflective of a better than average effect (Alicke & Govorun, 2005). The current findings may also indicate that coaches are aware of the environment they would like to, or feel they should, generate for their athletes, but struggle to translate this into practice. This gap in the desired and actual strategies used by coaches has been found in previous research with elite coaches working in youth soccer (Partington & Cushion, 2011). Not surprisingly in the current study, the correlations between observed and perceived features of the environment were generally positive but weak. This is consistent with previous findings examining the interdependencies between observed and perceived assessments of the motivational environment in team sports and in PE settings (Boyce et al., 2009; Curtis et al., 1979; Haerens et al., 2013; Smith et al., under review).

For the more objectively assessed environment, there was a significant degree of variability in the motivational dimensions emphasized by coaches on a session-by-session

basis. Specifically, there were fluctuations observed for both the empowering and disempowering dimensions of the environment. This variability in the environment created has implications for athletes' motivation as well as their cognitive, affective and behavioral responses (Gagne & Blanchard, 2007). Findings from diary study research suggests that what happens on a day-to-day basis impacts upon athletes' more general perceptions of the motivational training environment created for them (Gagne et al., 2003; Quested et al., 2013). Therefore, coaches should try to emphasize a consistently optimal and empowering environment, and minimize the use of disempowering strategies even if periodic, during their interactions with their athletes.

Despite the intra-individual variability found in the observed coaching environment, coaches' own reports of the environment were much more stable. This links to the points made previously and supports the proposition that coaches have a limited awareness of the actual strategies they use to instill motivation in their athletes. This finding aligns with results from previous research in recreational youth sport settings (Curtis et al., 1979; Smith et al., under review). It could also be that coaches' response to the questionnaire items, although framed at the situational level, were informed by more general perceptions of the environment they aim to create (Light, 2008; Partington & Cushion, 2011) and/or perhaps their own motivation and goal orientations (Keegan et al., 2011).

The present data may help explain why researchers often find a discrepancy between observed and perceived dimensions of the coaching or teaching environment (Curtis et al., 1979; Smith et al., under review). The variability found in one assessment of the environment (i.e., the observations) and stability in the other (i.e., coach perceptions) reduces the level of agreement between the two measures. This has consequences for attempting to modify the environment created by these coaches, as they perceive themselves to create a more

consistent and highly empowering motivational environment with little acknowledgement of their using disempowering strategies.

To encourage more empowering environments in academy sport settings, coaches may need to be more aware of the in-the-moment strategies they use to motivate their athletes. Coach-education programs such as Empowering Coaching™ (Duda, 2013) have been evolved to help coaches understand the principles of and create more motivationally adaptive environments for their athletes. The Empowering Coaching™ program should address the 'epistemological gap' between what coaches aim to do and what they are able to do, which has been identified as a limiting factor in coaches creating more optimal environments in previous research (Light, 2008; Partington & Cushion, 2011). Alongside this type of training program, it may also prove fruitful to draw from the reflective practice (Knowles, Gilbourne, Borrie & Neville, 2001) and/or mindfulness literature (Langer, 1989) to help coaches accurately identify, and become more aware of and in touch with, the types of strategies used and environments manifested on their teams.

Future Directions

In upcoming studies, researchers may build upon the current findings by including additional measures such as academy level athletes' perceptions of the environment and coaches' motivation and goal orientations. This information would help to further understand the dynamics of the coaching milieu at this competitive level (Keegan et al., (2011) and may be used to help promote more adaptive environments for young athletes participating at the more elite level. To further examine the stability of the coaching environment, samples should include both male and female coaches and focus on the session-by-session environment created by coaches working in individual sports and in training and competition settings (Smith et al., under review). This would add to the findings of the current study, which are based on male coaches working in one sport and in one country. A final, and

important direction for future research, is to examine the implications of stability/variability in situational and contextual reports of empowering and disempowering features of the motivational climate on athletes' responses to sport.

Conclusion

The present study is the first to apply Duda's (2013) recent integration of key tenets and concepts embedded in AGT and SDT to assess empowering and disempowering features of motivational coaching environment in an academy sport setting. In this novel study, we used a multi-method approach to examine the profile, interplay and stability of observed and coach-perceived reports of the motivational environment across a series of coaching sessions. Findings suggest that coaches emphasize and employ both empowering and disempowering motivational strategies when coaching their athletes. A discrepancy was found between objective reports and coach ratings of dimensions of the motivational environment. In addition, only weak (albeit mainly positive) associations emerged between observed and perceived reports of the same environment. Finally, results highlight a lack of stability in the observed motivational environment in terms of its empowering and disempowering features, while the coaches' reports revealed a stable and highly empowering environment. The present findings provide evidence for the need to help elite coaches be more aware of the environment they create for their athletes. Overall, the study sets the stage for ongoing work aimed at promoting more adaptive and empowering motivational environments created by coaches working in elite youth sport.

CHAPTER 6.

GENERAL DISCUSSION

Overview

Grounded within an integrated AGT (Nicholls, 1989) and SDT (Deci & Ryan, 2000) perspective, the current thesis aimed to develop and provide initial validation for a new observational measure of the multidimensional motivational coaching environment in sport. More specifically, the set of studies comprised within pull from Duda's (2013) conceptualization of the motivational environment as characterized by AGT- and SDT-emphasised dimensions of the environment, which could be considered more or less *empowering* and *disempowering.* This integrated perspective considers the motivational environment according to overarching constructs and tenets embedded within both AGT and SDT (Duda, 2013). Although, there similarities with need-supportive and need-thwarting motivational environments, the inclusion of AGT-based dimensions of the environment also offers further consideration to how competence is defined. Adopting this perspective, it is possible that a coach can promote task- or ego-referenced perceptions of competence, which are expected to hold distinct motivational consequences (Seifrez et al., 1992; Treasure, 1993). The value of employing this integrated approach is addressed in the following discussion.

Overall, the work presented in this thesis provides empirical evidence for the reliability and to a degree the validity of the Multidimensional Motivational Climate Observation System (MMCOS).There are a number of potential benefits resulting from the development of the MMCOS: First, the use of the MMCOS could help reduce reliance on self-report assessments of the motivational environment and offers a methodological approach to test relationships central to AGT and SDT that minimizes the likelihood of common method variance. Second the MMCOS provides an objective assessment of multiple dimensions of the motivational coaching environment that have been found to be empirically relevant and pull from two major theories (i.e., AGT and SDT) that have guided motivation work in sport psychology. Thirdly, the MCCOS offers an assessment method that can be

used in applied research to evaluate the effectiveness of coach-training programmes grounded in AGT and/or SDT, particularly those aimed at modifying the motivational coaching environment. Further, the MCCOS could be utilised during self-reflection activities to promote greater awareness of the motivational environment coaches create for their athletes.

The majority of sport-based research pulling from AGT and SDT has relied on self-report measures to examine the coach-created environment (Duda, 2001; Duda & Balaguer, 2007; Ntoumanis, 2012). Despite the popularity of observation in coaching research (Cushion et al., 2012; Kahan, 1999; Smith & Smoll, 2007), there has been a limited attempt to develop and employ measures to examine the objective features of the motivational environment relevant to AGT and SDT in sport (Boyce, Gano-Overway & Campbell, 2009; Webster et al., 2013). Furthermore, existing sport and physical education (PE) based measures focus on dimensions of the environment relevant to either AGT *or* SDT, and to date no attempts have been made to develop a system integrating the complimentary theoretical frameworks (Duda, 2013; Ntoumanis, 2001; Quested & Duda, 2010) to assess the objective environment operating in sport settings. The present thesis addressed the aforementioned limitations in the field.

Chapter 2 addressed the need to develop and validate a new measure to objectively rate features of the motivational climate relevant to both AGT and SDT in sport: namely, the Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press; Chapter 2). The findings from Chapters, 3, 4 and 5 provide evidence for the reliability and validity of the MMCOS when used to observe and rate the motivational environment created by coaches in youth sport settings. Specifically, in Chapter 3, criterion-related validity was examined by testing the relationships between athletes', coaches' and observers' reports of the coach-created motivational environment. In addition, the research described in Chapter 3 tested the associations between different perspectives of the motivational environment (i.e.,

athlete, coach and observer) and athlete motivation, thereby providing further information on the predictive validity of the measure. In Chapters 4 and 5, evidence for the discriminant validity of the measure was offered and information on the motivational environment created in different contexts and competitive levels was reported.

Taken together, the results of this thesis provide initial support for the reliability and content, construct, discriminant and to some extent the predictive validity of the MMCOS. The research described within this thesis reflects the first to test the relationship between motivationally relevant facets of the observed coaching environment, taken from both AGT and SDT, with athletes' basic psychological needs and sport-based motivation. Furthermore, results from the final two studies highlight important considerations for how the motivational coaching environment is assessed in future research. Findings also provide the basis for an explanation for the discrepancy often noted between coaches' reports of the environment they create and independent observations of that same environment. In this final chapter, the findings of the four studies reported in Chapters 2 - 5 will be discussed in relation to the methodological and theoretical advances made and suggestions will be given for future research.

Observing the Multidimensional Motivational Coaching Environment

Researchers conducting studies within AGT and SDT frameworks have often noted the empirical (Ntoumanis, 2001) and conceptual (Mageau & Vallerand, 2003) links between the two theories. Moreover, past research has also considered AGT and SDT emphasized dimensions of the motivational climate in terms of the prediction of athletes' psychological need satisfaction and indicators of their degree of well- and ill-being (Quested & Duda, 2010; Reinboth et al., 2004). However, it is only recently that the coach-created environment has been formally conceptualized as a multi-dimensional construct incorporating facets of the motivational environment emphasized within both AGT and SDT (Duda, 2013). Building on

the studies that tested motivational processes and outcomes associated with facets of the environment embedded in AGT and SDT (e.g., Reinboth et al., 2004; Reinboth & Duda, 2006; Quested & Duda, 2010; Sarrazin et al., 2002; Standage, Duda & Ntoumanis, 2003), Duda's (2013) recent conceptualization provides a more holistic interpretation of the motivational coaching environment by including dimensions of coach behaviour that support (autonomy support, relatedness support) and thwart (controlling) athletes' psychological needs, as well as dimensions of behaviour (i.e., task- and ego-involving) likely to promote task- or ego-involved perceptions of competence. As such, the recent conceptualization by Duda suggests that empowering dimensions of the coaching environment will satisfy athletes' basic psychological needs, promote more task-referenced perceptions of competence and consequently, induce more self-determined forms of motivation. More specifically, Duda (2013) proposes that 'empowering' motivational environments are defined as being high in autonomy supportive, relatedness supportive and task-involving features. In contrast, 'disempowering' environments would be high in characteristics expected to thwart athletes' psychological needs, promote ego-referenced perceptions of competence leading to more externally regulated and less self-determined forms of motivation. That is, a disempowering motivational environment is presumed to be characterised by controlling, relatedness thwarting and ego-involving features.

The MMCOS (Smith et al., in press; Chapter 2) was developed to enable researchers to objectively assess over-arching empowering and disempowering features of the motivational coaching environment as well as specific dimensions that could be considered more or less empowering and disempowering. Unlike previous observational systems (e.g., CBAS, PECAI, MPOWER), the MMCOS included dimensions of the environment relevant to both AGT and SDT that hold implications for athletes' autonomy, belonging and task-referenced sense of competence. Drawing from the 2 theories, thirty-five behavioural

strategies incorporated within eight dimensions of the environment were identified. Following initial piloting and discussion with experts, thirty-two behavioural strategies and seven dimensions of the environment were retained and included within the final MMCOS rating system. Dimensions included within the MMCOS were autonomy support, controlling, task-involving, ego-involving, relatedness support, relatedness thwarting and structure, which are consistent with the empowering and disempowering conceptualization of the motivational environment. Aligned with the more social-cognitive approach underpinning the present work, a 4-point potency rating scale was used to rate the dimensions of the coaching environment. The potency rating provides an indication as to the frequency, intensity and pervasiveness of the seven dimensions. Throughout the studies conducted within this thesis, the MMCOS has demonstrated good face validity (Chapter 2), factorial validity (Chapter 2, 4, & 5) and a moderate degree of predictive validity (Chapters 2, 3 & 5). Also, the MMCOS has demonstrated a moderate-to-good level of inter-rater reliability and showed good intra-rater reliability in Chapter 2.

An important point of discussion is the exclusion of the environmental dimension of 'chaos' (Chapter 2; Smith et al., in press) from the MMCOS. Chaos was not included in the conceptualization of the environment as empowering and disempowering as proposed by Duda (2013). However, Skinner and Edge (2002) have argued that chaotic environments would thwart athletes' perceptions of competence and therefore result in lower quality forms of motivation. During piloting and the first study reported in Chapter 2, there was a problem identifying and coding a chaotic motivational environment in the context of youth grassroots soccer. Many of the ratings of chaos were identified as 'not at all'. Our findings correspond to the results of Van den Berghe et al., (2013), who reported a mean observed chaos score of 0.06 (0.14). It is possible that in contrast to other dimensions of the environment, such as autonomy support and control (Bartholomew et al., 2009; 2010) or task- and ego-involving

(Duda, 1992; 2001) features, which are considered independent rather than polar opposites, structure and chaos may be on a continuum (Jang, Reeve & Deci, 2010; Reeve et al., 2004). In this case, increasing scores for structure would necessitate an almost null rating for chaos. Further, it seems that when a coach (or teacher) provides low levels of structure this could result in chaotic athlete or student behaviour, and therefore chaos might be better considered an outcome of coach behaviour rather than a dimension of the environment in and of itself. Nevertheless, behavioural strategies and motivational environments that thwart athletes' sense of competence, separate from the AGT-based information provided by ratings of task- and ego-involving behaviour, may need to be considered further in future research on the objectively-rated environment and athletes' need satisfaction and thwarting. In upcoming studies, and if the data are supportive, it may also be important to include a 'competence thwarting' dimension of the environment that might tap into coach behaviours not currently captured by the ego-involving dimension of the MMCOS. While we would expect the different dimensions included in the MMCOS to predict more than one of the psychological needs, including additional ratings on the competence thwarting behaviour of the coach might explain more variance in athletes' need satisfaction and need thwarting scores.

Overall, the factor structure of the MMCOS presented in Chapter 2 provides evidence for a motivational environment, which is characterized by two overarching 'empowering' and 'disempowering' factors. However, the consistent partial least squares analysis (cPLS) conducted in Chapter 2 also suggested a model of best fit when observed ratings on the ego-involving and structure dimensions were removed from the specified model.

In the case of the grassroots football coaches sampled and observations conducted in training sessions, the observed ego-involving dimension had a relatively low potency rating suggesting that coaches tended not to emphasize ego-involving criteria (M = 0.50; SD = 0.42). This may explain why the ego-involving dimension failed to load on the specified

factor in the present research. As expected, when observations were made during matches as well as at higher competitive levels, coaches emphasized a more potent ego-involving environment (Chapter 4 & 5). Moreover, the ratings made during matches (Chapter 4) and in more competitive environments (Chapter 5) were consistent with our hypothesis and resulted in positive correlations between the ego-involving, controlling and relatedness thwarting dimensions of the environment.

However, it is important to note that the within the studies described in Chapters 4 and 5, the recruited samples were relatively small. This meant that a reexamination of the factor structure using a cPLS was not possible. In future studies it would be of benefit to recruit larger samples of coaches in more competitive settings to further examine the factorial validity of the MMCOS. This would allow us to reexamine the construct validity of the MMCOS, with rated dimensions of the environment loading onto an empowering and disempowering factor.

Surprisingly, as described in Chapter 2, the dimension of structure did not significantly load onto the empowering dimension of the MMCOS, albeit it did have a positive factor loading. According to SDT, structure should support the need for competence and would be expected therefore to constitute part of an empowering motivational coaching environment (Curran et al., 2013; Mageua & Vallerand, 2003). Therefore, it is possible that there is crossover between the task-involving and structured dimensions of the motivational environment (albeit these dimensions of the environment are defined differently within AGT and SDT). This crossover may explain the suppressed factor loading of structure when including both dimensions in the cPLS analysis. Indeed in study 3 of Chapter 2, when removing structure from the multi-level model, the coefficients for the observed task-involving dimension and athletes' psychological needs increased (albeit not to a significant level). Given that both task-involving and structure are expected to promote a sense of

competence and skill development/improvement, these dimensions of the environment may share similar characteristics.

During the development of the MMCOS (Chapter 2), structure was defined as 'the instructions, organisation and guidance provided by the significant other (e.g., the coach) that informs his or her athletes about how to achieve success and meet the objectives of the activity at hand' (Skinner & Belmont, 1993). According to this definition, 3 core strategies were identified, including 'coach provides instructions and organisation', 'offers expectations for learning' and 'provides guidance throughout drills, activities and exercises'. Although these strategies are consistent with the literature, the overall dimension of structure is narrowly defined in comparison to previous SDT-based research (e.g., Jang et al., 2010). In education settings Reeve et al., (2004) considered structure according to three distinct phases, during introduction, during learning and during feedback. More recently, Haerens et al., (2013) also found structure to separate into before and during learning phases. According to the work by Reeve et al., (2004), structure during the introduction phase includes a leader providing 'clear, predictable, understandable and detailed instructions'. Within the MMCOS this was conceptualized as the 'provides clear expectations for learning'. During learning, Reeve et al., included three dimensions of structure, 'strong leadership', 'high workload', and 'scaffolding'. Within the MMCOS, the strategy 'provides instruction and organisation' links closely to leadership, however the high workload and scaffolding items were not included. Finally, Reeve et al., suggest that during feedback the leader will provide 'skill-building, informative and instructive' information. There is crossover here with the 'provides guidance during skills, activities and exercises' strategy in the MMCOS. However, when coding with the MMCOS feedback is rated at any point of the coaching session, not only following completion of an activity. As suggested above, there may be crossover between structure as defined within the broader SDT-literature (e.g., Haerens et al., 2013; Jang et al., 2010; Reeve

et al., 2004) and the task-involving dimension. Within the MMCOS the task-involving dimension includes four strategies, 'emphasises effort/improvement', 'use of cooperative learning', 'provides task-focused competence feedback' and 'emphasises role importance'. Emphasis on effort and improvement and providing competence-enhancing feedback are linked to items within the dimension of structure (e.g., scaffolding, skill-building). This may offer an explanation as to why the dimension of structure and not task-involving is predictive of competence and relatedness in Chapter 2, yet in Chapter 3 when the dimension of structure was not included, ratings of a task-involving climate emerged as a significant predictor of athletes' autonomous motivation. In future work, much like the ego-involving and competence thwarting dimension discussed above, it may be necessary to work towards an overall competence-support dimension of the environment if data are supportive of this development.

Recent extensions to the SDT literature also raise interesting questions regarding the role structure plays in the coaching (or teaching) environment. Researchers have examined the interaction between structure and other dimensions of the environment, most notably autonomy support (Jang et al., 2010; Sierens et al., 2009; Vansteenkiste et al., 2012). Given the independence of the environment dimensions (in that they account for unique variance in athletes'/students' motivational responses), it is possible that structure could also be emphasized alongside controlling criteria, which would then have implications for athletes' psychological need thwarting and associated maladaptive responses (Bartholomew et al., 2010; 2011). In Chapter 2, an alternative model was tested using data obtained from observing the grassroots soccer coaches. Adopting the same cPLS approach, structure loaded onto the disempowering rather than the empowering dimension. The findings revealed a poor model fit. However, in the research on elite coaches described in Chapter 5, the dimension of structure was positively correlated with both empowering and disempowering dimensions of

the environment. In future studies, it will be important to further examine the potential motivational 'colouring' of a structured motivational environment. Whilst we expect structure to support athletes' psychological needs, and in particular the need for competence, there may also be an interaction between structure and the more disempowering dimensions, resulting in maladaptive consequences for the athletes involved in such teams.

A particular strength of the present thesis was the employment of the MMCOS within the context of grassroots sport in four European countries. Following the development stages in Chapter 2 (i.e., studies 1 and 2), the MMCOS was translated and subsequently back translated using the approach recommended by Duda and Hayashi (1998). After translation, the MMCOS was used to rate the motivational coaching environment operating in grassroots football in England, France, Greece and Spain (Chapters 2 & 3). Overall, a moderate-to-good level of inter-rater reliability was demonstrated across all dimensions of the MMCOS when used to rate coaches in the four participating countries. Therefore as a consequence of this thesis, and associated work (e.g., Tessier et al., 2013), there is now an observational measurement system available in four different languages that can be used to provide a valid and reliable assessment of motivationally-relevant features of the coaching environment. To build on the studies conducted so far, and provide evidence for the cross-cultural validity of the MMCOS, researchers may test the invariance of relationships between observed dimensions of the coaching environment and key outcomes such as athletes' goal-involvement and motivation to participate in sport.

In subsequent work, researchers may choose to employ appropriately adapted versions of the MMCOS to rate the motivational environment created by leaders in other contexts such as in the education domain. Previous SDT-based research has utilized observational measures to examine characteristics of the social environment in the classroom (Reeve et al., 2004) and in PE settings (Cheon et al., 2012; Haerens et al., 2013; Van den

Barghe et al., 2013). The roles of a PE teacher and coach are to engage and educate their students/athletes to promote skill development, learning and performance. Consequently, it is possible that observational systems developed in sport (such as the MMCOS) could be also be used to rate the environment created by teachers in PE. There are currently no observational systems that integrate AGT and SDT and pull in particular from Duda's (2013) conceptualization to provide an assessment of the empowering and disempowering dimensions of the environment within education settings. Therefore, it would be interesting to employ the MMCOS in PE settings to rate the extent to which the teacher-created environment could be considered more or less empowering and disempowering. When applied to other contexts however, it is important for researchers to assess and report reliability and validity of the MMCOS to enable a comparison with findings from sport, as well as with other motivation-based observation measures that have been used to assess teachers in the education context (e.g., De Meyer et al., 2013; Haerens et al., 2013).

Motivational Environment, Basic Psychological Needs and Athlete Motivation

The extent to which the coach-created motivational environment is empowering and disempowering is expected to significantly impact on athletes' basic psychological needs and motivation. Past research has showed higher levels of psychological need satisfaction to predict more autonomous forms of motivation (Amorose & Anderson-Butcher, 2007). In contrast, low levels of need satisfaction are related to more extrinsic and less self-determined forms of motivation (Deci & Ryan, 2000). In sport, the coach occupies an important role and depending on the environment he/she creates, can promote or undermine need satisfaction and influence the quality of an athletes' motivation to participate (Amorose, 2007). When a coach is more empowering, athletes are expected to report higher levels of need satisfaction and more self-determined motivation (Duda, 2013). When a disempowering environment prevails, athletes would be expected to report lower levels of need satisfaction/greater need

thwarting and more controlled forms of motivation and potentially amotivation would be likely to result (Duda, 2013).

Prior to the present thesis and to our knowledge, no attempt had been made to test the aforementioned relationships using an observational assessment of the coach-created environment. Adopting such an approach minimizes the likelihood of biased results due to the common method used (De Meyer et al., 2013). Overall, findings reported in Chapter 2 and 3 are aligned with the results of previous research that has exclusively relied on self-reported assessments of the coaching environment, athletes' psychological needs and motivation (Adie et al., 2008; Amorose, 2007; Bartholomew et al., 2010; Quested & Duda, 2010; Sarrazin et al., 2002).

To a degree, observed empowering dimensions of the motivational environment (autonomy support & structure) were positively predictive of athletes' psychological need satisfaction. Most notably, structure was a significant and moderate-to-strong positive predictor of satisfaction of athletes' competence and relatedness. Despite the non-significant factor loading in the cPLS confirmatory factor analysis reported in the second part of Chapter 2, the findings of the third study in Chapter 2 suggest the inclusion of structure in the MMCOS was warranted – although the crossover with a task-involving climate as discussed above deserves further attention. The results also suggest that for athletes between the ages of 10 and 14 years old involved in recreational youth football, coach-provided structure is particularly key for the extent to which they report higher levels of competence and relatedness need satisfaction. Observed autonomy support was positively related to athletes' reports of autonomy need satisfaction and this relationship approached significance, albeit was relatively weak in magnitude.

In contrast to the empowering dimensions, disempowering dimensions of the environment were negatively related to athletes' reported psychological need satisfaction. In

particular, the controlling and relatedness thwarting were significant negative predictors of athletes' relatedness and competence respectively. The significant findings are consonant with previous research involving perceived assessments of dimensions of the motivational coaching environment. (Adie et al., 2008; Curran et al., 2013) and provide initial evidence to support the predictive utility of the MMCOS, in particular the structure, controlling and relatedness thwarting dimensions.

A particularly unique contribution of the study conducted within Chapter 2 was the inclusion of the relatedness-thwarting dimension. To our knowledge, no previous research (self-report or observational) has examined relatedness thwarting as part of the leader-initiated motivational environment. The significant negative relationship between the observed relatedness thwarting dimension of the environment and athletes' competence and relatedness satisfaction, highlights the importance of examining relatedness-thwarting aspects of coaches' behaviours. Including an assessment (observed and/or self-report) of relatedness thwarting in future research on the motivational environment could better explain how an athlete experiences and responds to sport and may account for more variance in athletes' psychological need satisfaction and thwarting.

A limitation of the work described in Chapter 2 is the focus on the relationship between the objectively assessed motivational climate and psychological need satisfaction and not psychological need thwarting. In recent advances to the SDT literature, both 'brighter' and 'darker' sides of the motivational pathway have been examined (Balaguer et al., 2012; Haerens et al., 2015). Although observed controlling and relatedness thwarting coach behaviours were negatively associated with psychological need satisfaction in our study on grassroots coaches (Chapter 2), it would also be expected that disempowering dimensions of the environment (i.e. controlling, ego-involving and relatedness thwarting behaviours of the coach) would positively predict athletes' psychological need thwarting. An

important extension to the work described within this thesis would be to assess athlete need satisfaction and need thwarting and evaluate the degree to which the dimensions of the objectively assessed multidimensional coaching environment predicted these variables.

Results from Chapter 3 build upon the findings of Chapter 2 by examining the associations between multiple perspectives of the coaching environment (i.e., athlete, coach and observed reports) and their links to athletes' motivation regulations. A key aim of this study was to compare the strength of the association between the different perspectives of the environment and athletes' autonomous motivation, controlled motivation and amotivation. This study focused specifically on the dimensions of the environment included in Duda's (2013) conceptualization; which included autonomy supportive, controlling, task-involving, ego-involving and relatedness supportive dimensions.

For athletes' reports of autonomous motivation (i.e., intrinsic & identified), athletes' perceptions of a task-involving climate emerged as a significant positive predictor. However, the observed task-involving dimension also positively predicted athletes' reports of more autonomous reasons for taking part in football and were stronger in magnitude. Furthermore, when observed and perceived assessment of a task-involving climate were included in the model simultaneously, the observed task-involving dimension remained the most significant predictor of athletes' reports of autonomous motivation. Typically researchers have suggested that what is particularly important for athletes' motivation and related responses is how they interpret and perceive the motivational environment (Horn, 2002; Deci & Ryan, 2000; Smith & Smoll, 2007). However the present finding suggests that observations of a task-involving climate might tap into features that are not 'picked up' and/or reported on by the athletes. It will be interesting to see whether this finding is replicated in future studies linking dimensions of the observed and perceived motivational environment with athletes' degree of self determination.

Athletes' perceptions of a controlling and ego-climate emerged as a significant positive predictor of their degree of controlled motivation and amotivation. When assessed objectively, controlling behaviours also positively predicted both controlled (composite of introjected and external regulation) and amotivation, replicating previous findings from within education settings (De Meyer et al., 2013). When included in the model with athletes' and coaches' perceptions, relationships between observers' and coaches' ratings of controlling behaviour and athletes' reports of controlled motivation and amotivation became non-significant. These results are contrary to the findings that emerged for autonomous motivation. This might suggest that athletes' perceptions of controlling coaching mediate the relationship between the observed assessment of the environment and their motivation. For example, when coaches are observed to employ controlling strategies, such as using extrinsic rewards or controlling language, athletes identify these behaviours, which then predict more controlled motivation and amotivation. In the present study however, the conditions for mediation were not satisfied as the relationship between observed and athlete-perceived reports of controlling coaching were not significant (albeit there was a trend). In future studies, it would be worthwhile examining the link between observed ratings of the coaching environment, athletes' perceptions of the coaching environment and athletes' motivation further.

Findings reported in Chapter 3 do suggest that observational assessments for task-involving and controlling dimensions of the motivational environment stemming from the employment of the MMCOS, could be used alongside, or perhaps as an alternative to, self-report measures. Overall, the positive associations between observed task-involving and observed controlling coaching environments with autonomous and more controlled forms of athlete motivation respectively, provide additional evidence for the predictive validity of the measure. Following the discussion above, it is interesting that the task-involving, and not the

autonomy supportive dimension (for both observed and athletes' perceptions), emerged as a significant positive predictor of athletes' autonomous motivation. This supports the inclusion of the task-involving dimension within the empowering conceptualisation of the motivational coaching environment.

Interestingly, in the studies described in Chapters 2 and 3, the majority of variance in athletes' basic psychological need satisfaction and different forms of motivation (i.e., autonomous, controlled and amotivation) was situated at the individual rather than team level. This suggests that athletes' need satisfaction and motivation is more independent and individual to them, rather than being shared with other group members on the same team. A similar finding has been reported in previous education-based studies when examining motivation-related variables such as the teaching environment and the motivation to study (De Meyer et al., 2013; Haerens et al., 2013). This finding points to the importance of considering the motivational environment at a more individual level as well as taking potential team level effects into account when examining the relationship between the observed motivational coaching environment and athletes' reports of their basic psychological needs and motivation. Future studies using the MMCOS might observe and rate the individual coach-athlete interactions, which would be expected to more strongly predict athletes' motivation as well as associated cognitive, affective and behavioural responses (Haerens et al., 2013). Conducting studies in individual sports, such as golf or tennis, would allow this proposition to be tested further. In individual sports, the coach-created environment holds direct 'one-on-one' relevance for the athlete being coached and therefore more significant associations between the observed environment and athletes' self-reported responses would be expected.

As indicated in Chapter 2 and Chapter 3, observed ratings of the degree to which the climate was ego-involving did not predict athletes' psychological need satisfaction or their

motivation to participate in sport. This finding is surprising, as athletes' perceptions of ego-involving coaching positively predicted both controlled and amotivation. Future studies should seek to clarify the role of an ego-involving environment and its inclusion as a dimension within the MMCOS. It is possible that the one-off observations conducted in the present study failed to capture the criteria that comprise athletes' perceptions of an ego-involving climate. Further research employing longitudinal methods, with repeated assessments of the observed and perceived environment, could further understanding of how ratings of ego-involving coaching associate with athletes' interpretations of and responses to sport. Environments more pronounced in ego-involving behaviours of the coach on display should also be considered. This would provide insight into the implications of creating an overt environment that focuses on normative criteria for success and emphasize superiority and winning.

In general, the findings described in Chapters 2 and 3 contribute to meeting the aims of this thesis by providing evidence for the predictive validity of the MMCOS. However, it is noted that the associations tested were relatively simplistic. In future studies, researchers could advance understanding of AGT and SDT based principles by using observations to test processes proposed within the two theoretical frameworks. With a focus on AGT, the MMCOS could be used to examine the expected relationships between the coaching environment, athletes' goal adoption and the application of effort, persistence and learning. Focusing on SDT, the MMCOS could be included within studies to test the hypothesized links between the multidimensional motivational coaching environment, athletes' need satisfaction and thwarting and resulting motivation to participate in sport (Balaguer et al., 2012).

Observed and Perceived Assessment of the Motivational Environment

Previous observational studies conducted in sport and PE settings have examined the congruence between different perspectives (i.e., athlete, coach and observer) of the motivational environment (Boyce et al., 2009; Curtis et al., 1979; De Meyer et al., 2013; Haerens et al., 2013;). In general, studies linking observed and perceived reports of the motivational environment have found relatively weak and non-significant relationships (Boyce et al., 2009; Curtis et al., 1979).

The findings of the present thesis are generally in line with results reported in previous studies that have found a relative lack of agreement between observed and perceived reports of the environment (Curtis et al., 1979; De Meyer et al., 2013). Relationships reported in Chapter 3 between observed and perceived assessments of empowering features of the motivational environment were weak and non-significant. This is similar to the findings by Curtis et al., (1979) who noted few significant correlations between athletes, coaches and observers on more supportive dimensions of behaviour. Also consonant with previous findings in education (De Meyer et al., 2013) and sport (Curtis et al., 1979), there were weak-to-moderate significant relationships between athletes', coaches' and observer's reports on more disempowering facets of the climate, and in particular the controlling features (Curtis et al., 1979). This was expected as controlling behaviours are considered to be somewhat more overt (De Meyer et al., 2013) and individuals have a tendency to be more aware of and pay attention to negative feedback and communication (Graziano, Brothen & Berscheid, 1980). For empowering dimensions of the environment, it is possible that after becoming familiar with a coach, athletes come to expect a certain type of relatively positive motivational environment and therefore their perceptions of the environment become set (Buchanan & Seligman, 1995). This might make it difficult to identify changes in empowering dimensions of the environment. In contrast, punitive dimensions of coach behaviour that are employed less frequently (Curtis et al., 1979; De Meyer et al., 2013) would be identified as unusual and

unfamiliar and are therefore acknowledged by an athlete. It is possible to examine this proposition by collecting data from athletes moving between teams, such as soccer players moving between age groups, and then determining changes in perceptons of the coach behaviours.

A possible explanation for the weak and non-significant findings between the observed, and athlete and coach perceived, assessments of the environment is the occurrence of a context by measurement confound (Lorenz et al., 2007). In their study on observed need-supportive teaching, Haerens et al., (2013) suggest that students may be drawing from more general perceptions of the environment to inform their ratings. This would create a mismatch in the assessments with the observations conducted at the situational level and students' reports being based on more general perceptions of the environment. The results of the study conducted in Chapter 3 provide support for the proposition put forth by Haerens et al., (2013). When situational observations were compared to athletes' more general reports of the environment,t the magnitude of the correlations were similar to what was reported in their 2013 study (Haerens et al., 2013).

The relationship between the observed and coach-perceived motivational environment was examined further in Chapter 5. To test for a context by measurement confound, coaches were asked to report on the motivational environment they created immediately following an observed coaching session. The correlations between observed and coach-perceived dimensions of the environment were generally aligned with the correlations reported in Chapter 3 (Autonomy Support 0.20 vs. 0.12; Controlling; 0.11 vs. 0.22; Task-involving -0.22 vs. -0.16; Ego-involving 0.15 vs. 0.29; Relatedness Support -0.13 vs. 0.13). In a similar finding, coaches seemed more aware of the punitive or disempowering dimensions of the environment created than was the case for empowering dimensions. However, despite addressing the measurement confound issue, the magnitude of the correlations which

emerged may still be considered relatively weak. This highlights the possibility that when individuals are asked to report on the motivational environment, regardless of how the questions are referenced, they will still draw from other resources (e.g., goal orientations, motivation regulations, general views on how the environment tends to be) to formulate their ratings (Keegan et al., 2011). Support for these possible explanations stems from the novel findings in Chapter 5 that highlight stability in coaches' reports of the environment and greater variability exhibited in observed ratings using the MMCOS. This indicates that while the overt coaching environment changes on a session-by-session basis, coaches do not identify such changes. This point is consonant with previous qualitative research suggesting that elite coaches working in youth soccer lack the understanding and awareness necessary to create the coaching environment they desire (Partington & Cushion, 2011).

Overall, findings from Chapter 3 and 5 provide tentative support for the criterion-related validity of the MMCOS. Findings presented in Chapter 3 offer a unique contribution to the literature as they represent the first attempt to examine the multidimensional motivational environment from the perspective of athletes, coaches and observers. However, more work needs to be conducted to explain the discrepancy between the observed and perceived ratings of the coaching environment in both grassroots and elite youth sport. This is particularly relevant for the task-involving and relatedness supportive dimensions, where negative correlations were noted between observers' ratings and coaches' reports on these dimensions in both Chapters 3 and 5. Given the significant findings between observed structure and athletes' psychological needs in Chapter 2, it would prove valuable to also include athletes' and coaches' perceptions of the degree of structure in the environment. In upcoming work researchers might adapt for sport scales from the Teacher as Social Context Questionnaire (TSCQ; Belmont et al., 1997). Building on the study conducted in Chapter 5, researchers may find it fruitful to employ diary study methods to further test the relationship

between athletes', coaches' and observers' ratings of the environment. Valuable information on how athletes and coaches construe their ratings would be garnered from such research. Aligned with Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation, fluctuations in dimensions of the observed and perceived environment recorded at the situational level could be used to predict more contextual ratings of the motivational environment provided by athletes and coaches. Diary studies have been successfully employed in the past to examine the relationship between the situational and more general perceptions of the coach- or teacher-created environment on athletes' motivational responses (Gagne et al., 2003; Quested et al., 2013). In future research using the 'diary' methodology, researchers might target antecedents of coach behavior, such as their own motivational orientations, perceived pressures and the environment they operating in. Results from cross-sectional studies utilizing self-report and observational methods, has highlighted the aforementioned variables as antecedents of the coaching and teaching environment (Stebbings et al., 2011; Van den Berghe et al., 2013) created and therefore inclusion in future studies is warranted.

A further extension to the present work would be to include athletes' perceptions of the peer- and parent-created environment alongside objective and perceived assessments of the coaching environment. The coach, peers and parents are likely to have considerable influence on athletes participating in youth sport (Vazou et al., 2005). Away from training and match settings, athletes have a greater level of exposure to their peers and parents. Therefore young athletes' perceptions of the environment might be more influenced by these sources. Within training and match settings there are also likely to be other micro-climates (e.g., peer- and parent-created environment) created within the larger social environment. Future studies could seek to examine the peer- and parent-created environment within training and match settings using a modified version of the MMCOS. Given that the

behavioural strategies and environment dimensions included within the MMCOS are assumed to be relevant to diverse significant others and contexts (Mageau & Vallerand, 2003; Vazou et al., 2005), and are not particularly situational specific, the application to rate individuals in different contexts should be straightforward. Applying the MMCOS in the suggested way would offer a unique and interesting direction for AGT and SDT-based research on the motivational environment operating in sport settings.

Given the importance of the motivational environment for promoting more optimal forms of athlete motivation (Amorose & Anderson-Butcher, 2007; Duda, 2013; Pelletier et al., 1998), intervention may need to focus on bringing athletes', coaches' and observers' reports more in line. This is important if coaches are to understand the behaviours that result in adaptive psychological responses within their athletes. There are many ways in which this could be achieved. It is possible that the MMCOS could be used as part of a self-reflection activity to help coaches understand the motivational characteristics of the environment they are observed to create (Duda & Balaguer, 2007). Observational methods have been applied to aid self-reflection in previous AGT-based research on the environment created by teachers in PE (Morgan & Kingston, 2010). An alternative and a popular line of enquiry in the general psychology literature is the concept of mindfulness (Brown & Ryan, 2003; Langer, 1989). Mindfulness is defined as paying attention to and being aware of what is happening in the present (Brown & Ryan, 2003). Typically, mindfulness interventions are used to raise an individuals' awareness of his or her emotions and thought processes in a non-judgmental way (Baer, 2003). However, the process of mindfulness could also be applied to raise coaches' awareness of their behavior, which we would expect to result in higher levels of agreement between athlete, coach and observer reports of the created environment. We would expect this to facilitate interventions aimed at helping coaches modify their behavior and create more optimal and empowering environments for their athletes.

The Motivational Environment in Different Contexts and Competitive Settings

Based on a limited number of studies (e.g., van de pol et al., 2011) that have been conducted to date, it is expected that coaches would create a more punitive and ego-involving environment in competitive settings when contrasted to the environment created during matches. This corresponds to the suggestion by Mageau and Vallerand (2003) that when placed under the pressure of competition coaches will rely on more controlling criteria in an attempt to influence their athletes' motivation, learning and performance.

Findings in Chapter 4 are consistent with the proposition by Mageau and Vallerand (2003) and previous findings reported by van de pol (2011) that showed differences in the environment created between training and competition. Specifically, in the present study, coaches were observed to create a less empowering and more disempowering environment in competitive settings that was the case in the training settings. These findings offer support for the sensitivity of the MMCOS in that this observation system is able to discriminate between different contexts as expected. Furthermore, the results provide detailed information on strategy use underpinning the differences in the observed environments. Distinguishing between the motivational environment created during training and matches offers important directions for future research. Findings from Chapter 4 indicate areas that coaches could emphasise certain strategies further e.g., 'encouraging intrinsic task interest', and where they might attempt to minimise other strategies e.g., 'overt personal control' during matches.

Typically, self-report studies on the motivational environment ask athletes to respond to items concerning the typical coach-created climate on the team, not distinguishing between training and matches (Smith et al., under review; Chapter 4). However, the present findings indicate that coaches objectively create a less empowering and more disempowering environment in matches compared to the case in training. This suggests that we may get better prediction of context specific need satisfaction (and thwarting) and associated

outcomes if we assess the motivational environment in training and competition separately (via either observed or perceived methods). Overall, findings from studies separately assessing the coaching environment in training and matches would further our understanding of motivational processes operating in sport and help researchers identify where to intervene in order to promote more optimal forms of motivation for athletes taking part in youth sport.

When working at higher competitive levels, coaches were also observed to create a more potent empowering and disempowering motivational environment. Highly qualified elite coaches would be expected to have higher levels of efficacy (Feltz, Chase, Moritz & Sullivan, 1999) and therefore may feel more confident in their interactions with athletes. This might translate into a more potent motivational environment being created and observed (Feltz et al., 2001). Interestingly, these elite and perhaps more efficacious coaches were observed to more potently emphasise disempowering features of the coaching environment when contrasted to grassroots level coaches observed in an earlier study (Tessier et al., 2013). Conceivably these elite academy level coaches could experience greater feelings of pressure from their organization and from parents, inducing a more controlled motivational orientation resulting in the use disempowering motivational strategies (Mageau & Vallerand, 2003; Stebbings et al., 2011l Van den Berghe et al., 2013). It is possible to test this proposition in future studies and this would contribute to a better understanding of the antecedents of the coaching environment and how we to help coaches avoid creating a disempowering climate.

An additional finding noteworthy of discussion is the gap between the observations and coaches' reports of the environment they create. When asked to report on the environment, coaches in Chapter 5 indicated creating a highly empowering climate with few disempowering features. This was in contrast to what was observed by independent raters. A similar finding has been reported in education-based studies observing features of the environment relevant to SDT (Taylor & Ntoumanis, 2007). The inflated reports of an

empowering coaching environment could be considered as a better-than-average effect (Alicke & Govorun, 2005), where coaches are overly positive when ratings themselves against a normatively referenced standard (Ntoumanis, 2012).

Overall, the findings in Chapters 4 and 5 support the sensitivity to change and discriminant validity of the MMCOS, indicating that the observation system can detect hypothesized differences in the motivational environments manifested in the broader sport arena. The present findings emphasise the importance of considering the motivational environment created by coaches in both training and in matches and at higher competitive levels. According to AGT and SDT, we would expect the same processes to be at play in both contexts (i.e., training and matches) as well as at the elite and non-elite level. Therefore subsequent research could focus on helping coaches create more adaptive environments (i.e., promoting more empowering and less disempowering features) in training and in more competitive settings, which would likely hold important implications for the quality of the youth sport experience.

Summary and Practical Implications

Grounded within an integrated AGT and SDT approach (Duda, 2013), the aim of this thesis was to contribute to the literature by developing an observational measurement system to assess the multidimensional (and indeed, higher order, in terms of empowering and disempowering features) motivational coaching environment. Aside from the empirical and theoretical advances resulting from these studies, there was also a desire to contribute to 'real-world' coaching and understand how to help coaches foster more adaptive, optimal and empowering motivational environments in youth sport. A number of practical implications have resulted from the studies included in this thesis.

Despite a number of non-significant findings in Chapters 2 and 3 as discussed above, several expected associations emerged between observed structure created by grassroots

football coaches and athletes' psychological need satisfaction, as well as between the observed task-involving dimension and athletes' reports of autonomous motivation. In contrast to these more empowering dimensions of the environment, more potent disempowering environments, and in particular controlling and relatedness thwarting dimensions of the coaching environment, were linked to lower levels of need satisfaction and more controlled forms of motivation and amotivation. This distinction in the associated outcomes between empowering and disempowering dimensions of the environment has certain applied consequences, Observed ratings of potency across the more empowering dimensions of the environment, in both grassroots and elite football coaches, were identified as weak-to-moderate suggesting there may be room for improvement.

Previous research has demonstrated positive associations between need satisfaction, autonomous motivation and a variety of adaptive responses including more enjoyment (Alvarez, Balaguer, Castillo & Duda, 2009), increased positive affect (Gagne et al., 2003), vitality (Reinboth & Duda, 2006), and greater levels of persistence (Pelletier et al., 2001). Therefore promoting more empowering environments, with a particular emphasis on structure and task-involving dimensions (given the findings of Chapters 2 & 3), should result in increases in need satisfaction and autonomous motivation, which are expected to have adaptive and health-conducive ramifications. To this end, the delivery of coach intervention programmes that support coaches in creating more adaptive, empowering motivational environments are warranted.

Although considered an important direction for future work, there have been relatively few attempts to intervene and modify the motivational environment created by coaches in support (Roberts, 2012). Within education settings, several interventions have been delivered to help teachers optimize the motivational environment developed for their students (Reeve et al., 2004; Tessier et al., 2008). In a recent contribution to the literature,

the European-wide Empowering Coaching™ (Duda, 2013a) programme has been delivered to coaches in 5 different countries and aimed to facilitate more autonomy supportive, task-involving and relatedness supportive (i.e., empowering) environments by coaches working in youth sport. The MMCOS has been employed to evaluate the effectiveness of the Empowering Coaching™ intervention programme and provides information on whether coaches create more adaptive environments on completion of the training package.

The recording and observation of coach behaviours also offer a valuable feedback mechanism and may be employed with coaches on the ground to help them understand, identify and regulate the environment they create for their athletes (Duda & Balaguer, 2007; Morgan & Kingston, 2010). To date there has been a limited attempt to provide coaches with objective information on the environment fostered on their team. Using the MMCOS, coaches would have the opportunity to reflect on and receive feedback on the motivational environment being manifested through their behaviours/interactions with athletes. This is particularly important given the discrepancy in the observed and perceived environments noted for grassroots football coaches in Chapters 3 and for elite football coaches in Chapter 5. Ultimately, this should help raise coaches' awareness of the type of environment they are creating for their players and help support these individuals to create conditions where they are able to identify, regulate and manage the environment they create for their athletes (Duda, Cumming & Balaguer, 2005).

Based on the data collected as part of this thesis, both grassroots and elite level football coaches would benefit from emphasising more adaptive motivational strategies in an attempt to create more potent empowering training environments. In particular, data from Chapter 4 suggest that grassroots coaches could focus on specific strategies such as emphasising intrinsic interest in the activity, using more cooperative learning, fostering an inclusive environment and providing clear expectations for learning.

Overall, while promotion of more empowering motivational environment deserves attention, coach behaviours observed in more competitive contexts, such as match situations (Chapter 4) and at higher levels of performance (Chapter 5), also reflected more pronounced disempowering motivational characteristics to a degree that was observed to be moderately potent. Clearly efforts are also needed to help youth sport coaches at the grassroots and elite level minimise the use of disempowering strategies while also fostering more empowering environments.

For grassroots coaches, specific attention should also be paid to match contexts where they were observed to emphasise more disempowering dimensions of the environment as well utilise less empowering motivational strategies. During matches, coaches could try and acknowledge athletes' feelings and perspectives, encourage cooperative learning and make sure the environment is inclusive, while also reducing overt control, minimising emphasis placed on superiority and avoiding the exhibiting of a cold or critical demeanour. At the elite level and in training contexts, coaches would benefit from reducing the extent to which they exhibit or engage in controlling and ego-involving dimensions of the environment and promote more autonomy supportive and relatedness supportive environments. Based on the present findings, training programmes, such as Empowering Coaching^{TM} should not only focus on the promotion of empowering motivational environments but also on managing the pressures on coaches to ensure the use of disempowering criteria are reduced. As part of this training it is important to ensure coaches are aware of disempowering motivational strategies and why they are problematic.

Research conducted in sport and PE settings suggests there are certain pressures acting upon coaches, which result in them utilizing more disempowering motivational strategies (Mageau & Vallerand, 2003; van de pol et al., 2011). These are classified as 'pressures from above' (i.e., organizational structure), 'pressure from below' (perceptions of

athletes' motivation) and 'pressures from within' (i.e., coaches' own orientation) (Allen & Shaw, 2008; Taylor, Ntoumanis & Standage, 2008). Findings from both the educational and sport literature have suggested that pressure from 'above' (e.g., from their own managers) results in teachers and coaches adopting more controlling and perhaps disempowering motivational strategies (Flink, Boggiano & Barrett, 1990; Stebbings et al., 2011). Addressing the environment coaches are operating in themselves is clearly pertinent to enabling more adaptive environments to be fostered.

Limitations and Future Directions

During this final chapter a number of limitations have been discussed and suggestions for ongoing work have been provided. One primary limitation to the present set of studies was the relatively simple models tested. This was deemed necessary to establish the predictive capabilities of the MMCOS. However, as proferred within the AGT and SDT frameworks, there are a variety of motivational processes that could be examined using such an observational system. One such process is the mediating role of the basic psychological needs (satisfaction and thwarting) between observed empowering and disempowering features of the environment and athletes' motivation regulations purported by SDT. This is yet to be tested using a mixed-methodological approach and would provide a more conservative test of relationships proposed within SDT. Findings would also offer valuable information on the overt strategies and dimensions that could be recommended to coaches aiming to create an environment that satisfies their athletes' psychological needs and reduces need thwarting. Present findings would be suggestive of a model including structured, controlling and relatedness thwarting dimensions of the motivational environment predicting athletes' need satisfaction/thwarting and subsequent motivation in youth sport.

In addition, it would also be interesting to examine the relationship between observed dimensions of the motivational environment and athletes' goal involvement in an activity. To

date, research on athletes' goal involvement (and antecedents such as the motivational climate) in an activity has been limited due to the reliance on athletes completing self-report measures. Using the MMCOS, alongside short athlete diaries, would enable researchers to test the extent to which empowering and disempowering dimensions of the environment associate with athletes' degree of task- and/or ego-involvement in an activity. Empowering dimensions of the environment, specifically the task-involving dimension, focus on promoting self-referenced conceptions of competence and would be expected to positively predict athletes' task-involvement. In contrast, disempowering dimensions focus on other-referenced criteria for success, specifically the ego-involving dimensions, and would expected to predict athletes' proneness for adopting a more ego-involving focus in an activity (Duda, 2013; Duda & Balaguer, 2007).

In upcoming studies, it is important to consider the issue of context by measurement confound and lend thought to how the observation measure is used to provide either a more situational (e.g., a one off observation) or contextual (e.g., conducting multiple observations over time) assessment of the coaching environment being observed. Within the present thesis different methodological approaches were used, whereby observations were compared to more contextual ratings of the environment in Chapter 3 and to more situational assessments of the environment in Chapter 5. Results from both studies were consistent with previous findings in PE (Haerens et al., 2013) and sport (Curtis et al., 1979) settings and revealed a lack of agreement between observed and perceived measures of the environment. However findings in Chapter 5 provided an extension to previous work and suggest that while there was variability in situational observations, coaches' reports of the environment they create on a session-by-session basis were stable. Future research should further examine the stability of the observed, coach- and athlete-perceived assessments of the environment during repeated observations and examine whether there are critical points or interactions between athletes

and coaches that frame athletes' perceptions of the environment created. Overall, findings from these types of studies would also provide further detail on the criterion-related and predictive validity of the MMCOS.

The four studies conducted as part of this thesis have provided new information on the overt motivational environments created and strategies used by coaches in both grassroots (i.e., Chapters, 2, 3 & 4) and elite (i.e., Chapter 5) level sports, as well as in training and match contexts (i.e., Chapter 4). Examining the antecedents of the observed coaching environment would provide further information on why a coach creates a certain type of motivational environment, similar to studies conducted on adult coaches using self-reports (Stebbings et al., 2011) and within PE settings using observational methods (van den Berghe et al., 2013). Including measures of coaches' own motivation, goal orientations, and the perceptions of the motivational environment (e.g., autonomy supportive and control) they are operating within could explain why certain motivational strategies and prevailing environments are observed. Ultimately, understanding the antecedents of different coaching environments would offer valuable insight to intervention studies aimed at optimizing the environment coaches create for their athletes.

Having established a profile of the motivational environment created by coaches in different competitive settings (i.e., grassroots vs. elite, training vs. matches), attempts could be made to intervene and help coaches optimise the environment created for their athletes. The use of the MMCOS in longitudinal studies, and particularly intervention studies, such as within the Promoting Adolescent Physical Activity project (PAPA; Duda, 2013), would provide additional information on whether coaches are able to modify the environment they create after receiving training, which would provide detail on the validity of the MMCOS. This would build on the correlational studies included within this thesis.

Findings from Chapter 3 indicate a limited degree of agreement between observers, athletes and coaches on the motivational environment manifested in training sessions. In future studies, using the MMCOS alongside alternative assessments of the motivational environment, such as athletes' and coaches' self-reports, before and after an intervention would provide the opportunity to examine whether coaches have 1) objectively changed their behavior, 2) whether coaches' and observers' reports become more aligned, and 3) whether athletes also identify changes in the environment created. Understanding whether transitions and modifications in the motivational environment have taken place and how coaches and athletes interpret these changes is important if we are to promote more adaptive environments for athletes engaging in youth sport.

In general, further work on the categorisation and dispersion of behavioural strategies included within each dimension of the MMCOS is needed. Adopting the rating approach used in Chapter 4, as well as recruiting a larger sample of coaches, would allow us to examine the factor structure at the behavioural strategy level. This information would help refine the MMCOS and may result in improved construct and predictive validity of the system. This is important for several reasons. For example, although included as an ego-involving motivational behavior within the PMCSQ-2 (Newton et al., 2000) and assumed to be relevant to ego-involving conceptions of competence and fear of failure, 'punishing mistakes' might be better represented as a controlling motivational strategy. To some extent, findings from Chapter 3 are supportive of this notion. Coaches' perceptions of controlling coaching were positively associated with athletes' reports of both controlling and ego-involving motivational environments. In addition, strategies included within a task-involving dimension, such as 'use of cooperative learning', might be more relevant to athletes' sense of relatedness than competence. Similar to the justification for punishing mistakes and ego-involving coaching, coaches' reports of a task-involving environment were significantly

associated with athletes' reports of relatedness support and not task-involving coaching. Although observational data were not consistent with the findings between coach and athlete reports of the environment, a reexamination of factor loadings when including individual behavioural strategies might improve the predictive utility of the MMCOS. However, consistent with previous research we would expect empowering dimensions of the environment to be moderately positively correlated (Quested & Duda, 2010; Reinboth et al., 2004). This means that when a coach is task-involving they may also be emphasising relatedness supportive criteria, albeit that the two dimensions of the environment are theoretically distinct as supported by the PLSc analysis conducted in Chapter 2.

Despite recruiting coaches and athletes from different countries and conducting observations in different contexts and competitive levels within this work, the focus of the thesis studies was almost exclusively on males in youth sport. In addition, the replication of PAPA project data used in Chapters 2 and 3 limits the extent to which we can generalize current findings to other groups of sport coaches and athletes. Although collecting a large amount of observational data is challenging (Kavussanu, 2008), to further validate the construct validity and predictive utility of the MMCOS adequate sample sizes and different populations of coaches will be required. In future studies, the reliability and validity of the MMCOS should be examined in the case of more heterogeneous samples, including female athletes and coaches, adult sport participants and those competing in individual sports. Given the important developmental aspects of AGT (Fry & Duda, 1997; Weiss & Williams, 2004; Wigfield & Wagner, 2007), it would also be worthwhile examining the objective environment created by coaches working with even younger athletes than was the case in the studies comprising this thesis. Information garnered from these studies will offer new evidence for the reliability and validity of the MMCOS and provide a unique context to measure some of the processes relevant to AGT and SDT discussed earlier.

Finally, and to reiterate some of the points made earlier, future research using the MMCOS may examine the predictive capabilities of the objective rating system in relation to other theoretically related cognitive, affective and behavioural outcomes. In the studies comprising this thesis, the criterion-variables were limited to athletes' psychological needs and motivation, and athletes' and coaches' reports of the motivational environment. However, in subsequent studies, researchers may seek to test the predictive utility of the MMCOS alongside indicators of well- and ill-being (e.g., positive and negative affect; Watson, Clark & Tellegen, 1988), immunological markers such as Secretory ImmunoglobulinA (e.g., SigA; Bartholomew et al., 2011), as well as objectively assessed physical activity (Fenton, Duda, Quested & Barrett, 2014. These attempts would provide further evidence on the implications of empowering and disempowering features of the motivational environment.

Conclusion

Within this final chapter, the most poignant findings from the four empirical chapters have been reviewed and discussed. Collectively, the results of the studies provide initial support for the reliability and to a lesser degree the validity of the newly developed Multidimensional Motivational Climate Observation system (MMCOS). Firstly, the MMCOS has demonstrated acceptable levels of reliability in multiple studies conducted with samples from different countries, contexts and competitive levels. Findings from the four studies also provide preliminary evidence for the content and construct validity of the MMCOS. However, further research is warranted on the categorisation of the behavioural strategies and the included environmental dimensions as well as the hierarchical structure of the measure. In addition, there were a number of non-significant relationships between observed dimensions of the environment and athletes' basic psychological need satisfaction and motivation. More research, and possible amendments to the MMCOS will be needed to improve the capabilities

of the system. Nevertheless, the steps taken to develop the MMCOS move beyond the typical approaches used to develop or amend coach observation systems in the sport domain. The processes employed in the current studies may provide guidance to other researchers interested in developing and conducting observational research in sport.

The development of a theory-driven and theoretically integrated observation system, that captures the broad and diverse dimensions of the coaching environment relevant to both AGT and SDT, offers new directions for research grounded within these complimentary frameworks. Working towards a parsimonious and theoretically sound integration requires further work. Therefore research which examines the relationships between different dimensions of the motivational environment is warranted.

Overall, whilst the coaches observed in the present set of studies employed a variety of adaptive motivational strategies, there was certainly room for improvement highlighting the need to help coaches create more empowering and less disempowering motivational environments for their athletes. Clearly there is more work to be done and the validation of the MMCOS does not stop here. Researchers should continue to examine the reliability and validity of the MMCOS when conducting research with different samples, in different settings and alongside other relevant antecedents and outcomes of athlete motivation.

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APPENDICES

APPENDIX 1 – Materials used in Chapter 2

APPENDIX 2 – Materials used in Chapter 3

APPENDIX 3 – Materials used in Chapter 4

APPENDIX 4 – Materials used in Chapter 5

APPENDIX 1: Material used in Chapter 2

Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press)

Part 1: For each specified time interval (i.e., 5/15 minutes), rate the extent to which the strategies employed by the coach reflected each of the 7 environment dimensions using the scale 0 (not at all) – 3 (strong potency) (use the marking scheme to inform your answer).

Context: Training / Match (circle as appropriate)

Environmental Dimension	Lower Order Strategies	Time			
	0 – Not At All 1 – Weak Potency 2 – Moderate Potency 3 – Strong Potency				
Autonomy Supportive An autonomy-supportive environment prevails when a coach attempts to identify and nurture their players' needs, interests and preferences, whilst encouraging them to take control over their own participation.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides meaningful choices				
	Provides a rationale for tasks, requests and constraints				
	Emphasises and encourages intrinsic task interest				
	Creates opportunities for input				
	Encourages initiative taking				
	Acknowledges feelings and perspective				
Controlling The environment created by the coach thwarts players' feelings of control by coercing and pressurising them to behave in a specific way.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Uses extrinsic rewards				
	Uses controlling language (want, need, must)				
	Intimidation (frightens with threats)				
	Negative conditional regard				
	Overt personal control				
	Devalues players' perspective				
Task-involving A task-involving climate prevails when the coach focuses on self-referenced criteria for success. In a task-involving climate the coach emphasises the importance of self-improvement, demonstrating task-mastery and exerting effort to achieve success.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Emphasises/recognises effort and/or improvement				
	Uses cooperative learning				
	Provides task-focused competence feedback				
	Explains role importance				
Ego-involving An ego-involving climate prevails when the coach focuses on other-referenced criteria for success. In an ego-involving climate the coach focuses on players outperforming one another and demonstrating high normative standards.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Punishes mistakes				
	Emphasises/recognises inferior/superior ability				
	Encourages inter/intra-team rivalry				
Relatedness Supportive Relatedness supportive and personally close social environments encourage feelings of care, acceptance, inclusion, trust and respect, and this is communicated in a warm, positive, consistent and non-contingent manner		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Ensures players are included in drills, activities, exercises				
	Engages in non-instructional conversation with players				
	Adopts a warm communication style				
	Shows care and concern for players				
	Shows unconditional regard				
Relatedness Thwarting		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3

A relatedness thwarting environment stop players' feeling a sense of relatedness (belonging). A relatedness-thwarting environment is likely to be cold, critical and marked by acceptance being contingent upon desirable behaviour.	Excludes players from certain drills, activities, exercises				
	Restricts opportunities for interactions and conversation				
	Shows a lack of care and concern for players				
	Belittles (makes an attempt to embarrass) players				
	Adopts a cold communication style				
Structure A structured motivational climate is characterised by the coach providing players with information on organisation and performance, guidance and expectations for learning.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides instructions and organisation				
	Offers expectations for learning				
	Provides guidance throughout drills/activities/exercises				

Part 2: Rate the extent to which the coach was empowering and disempowering across the whole training session. Please circle your response on each scale (empowering & disempowering).

Empowering				**Disempowering**			
0	1	2	3	0	1	2	3
Not at all	Weak	Moderate	Strong	Not at all	Weak	Moderate	Strong

Multidimensional Motivational Climate Observation System Marking Scheme

At the end of each time interval (i.e., 5 minutes/15 minutes) please make a rating as to the extent to which the coach emphasised the 7 environmental dimensions.

Environmental Dimensions:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
- No strategies used by the coach	The coach may use one type of strategy The strategies may be used infrequently These could be used privately with a small number of players The coach may appear to use the strategies passively will little intention	The coach may use more than one type of strategy. These could be delivered to many of the players (privately or publicly to the whole group) These could be low/moderate intensity Importantly, the coach could do more to emphasise the dimension further	The coach clearly uses a variety of different strategies These strategies should impact upon the whole group (either through private delivery with many players or in public with the team) The coach will emphasise the dimension much more strongly and with greater intensity The coach could not do any more to emphasise the dimension further

Higher Order Rating:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
Overall the climate had no or almost no empowering or disempowering features.	The strategies employed by the coach may support/thwart one of the basic psychological needs (i.e. autonomy) The environment created could potentially support/thwart the other needs but this will be at a low level.	The strategies employed by the coach clearly support/thwart more than one of the basic needs The other need(s) could also be supported/thwarted but this will be less evident The environment could still be made more empowering/disempowering via the use of different strategies	The strategies employed by the coach and how they were delivered creates a climate likely to support/thwart all of the basic psychological needs and encourage task- or ego-focused conceptions of competence respectively. All of the needs are supported/thwarted by the strategies adopted by the coach

Basic Psychological Need Satisfaction

Autonomy was tapped via 5 items from the Autonomy Scale (Standage et al., 2005)

Competence was tapped via 6 items from the Perceived Competence subscale of the Intrinsic Motivation Inventory (McAuley et al., 1989)

Relatedness was tapped via 4 items from the Acceptance subscale of the Need for Relatedness Scale

*These statements relate to your **feelings and experiences on your football team over the past month (i.e., 4 weeks ago until now)***

During the last month, in this football team...	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I decided which activities I practiced.	1	2	3	4	5
2. I think I was quite good at football.	1	2	3	4	5
3. I felt people supported me.	1	2	3	4	5
4. I had a say on what skills I worked on.	1	2	3	4	5
5. I am satisfied with what I did.	1	2	3	4	5
6. I felt people understood me.	1	2	3	4	5
7. It was my choice to play football.	1	2	3	4	5
8. I was skilful.	1	2	3	4	5
9. I felt people listened to my opinion.	1	2	3	4	5
10. I felt the freedom to do some things my own way.	1	2	3	4	5
11. I felt quite competent.	1	2	3	4	5
12. I felt people valued me.	1	2	3	4	5
13. I felt I performed very well.	1	2	3	4	5
14. I had some choice in what I	1	2	3	4	5

did.					
15. I think I did quite well.	1	2	3	4	5

APPENDIX 2: Materials used in Chapter 3

Multidimensional Moitvational Climate – Athlete Perceptions

Empowering and Disempowering Motivational Climate Questionnaire-Coach (Appleton et al., under review)

This list describes what coaches say or do to the players on their team. When giving your answers, think about what ***your main coach*** normally says or does. What do *you* think it was like on this team most of the time during the last 3-4 weeks? What kind of atmosphere has ***your coach*** generally created during the last 3-4 weeks?

When completing this section, think about what it has generally been like on this team during the last 3-4 weeks.	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. My coach encourages players to try new skills.	1	2	3	4	5
2. My coach is less friendly with players if they don't make the effort to see things his or her way.	1	2	3	4	5
3. My coach gives players choices and options.	1	2	3	4	5
4. My coach tries to make sure players feel good when they try their best.	1	2	3	4	5
5. My coach substitutes players when they make a mistake.	1	2	3	4	5
6. My coach thinks that it is important that players participate in football because the players really want to.	1	2	3	4	5
7. My coach is less supportive of players when they are not training and/or playing well.	1	2	3	4	5
8. My coach can really be counted on to care, no matter what happens.	1	2	3	4	5
9. My coach gives most attention to the best players.	1	2	3	4	5
10. My coach yells at players for messing up.	1	2	3	4	5

11. My coach makes sure players feel successful when they improve.	1	2	3	4	5
12. My coach pays less attention to players if they displease him or her.	1	2	3	4	5
13. My coach acknowledges players who try hard.	1	2	3	4	5
14. My coach really appreciates players as people, not just as footballers.	1	2	3	4	5
15. My coach only allows something we like to do at the end of training if players have done well during the session.	1	2	3	4	5
16. My coach answers players' questions fully and carefully.	1	2	3	4	5
17. My coach is less accepting of players if they have disappointed him or her.	1	2	3	4	5
18. My coach makes sure that each player contributes in some important way.	1	2	3	4	5
19. My coach has his or her favourite players.	1	2	3	4	5
20. My coach only rewards players with prizes or treats if they have played well.	1	2	3	4	5

21. My coach only praises players who perform the best during a match.	1	2	3	4	5
22. When my coach asked players to do something, he or she tries to explain why this would be good to do so.	1	2	3	4	5
23. My coach makes sure everyone has an important role on the team.	1	2	3	4	5

24. My coach shouts at players in front of others to make then do certain things.	1	2	3	4	5
25. My coach thinks that only the best players should play in a match.	1	2	3	4	5
26. My coach threats to punish players to keep them in line during training.	1	2	3	4	5
27. My coach listens openly and does not judge players' personal feelings.	1	2	3	4	5
28. My coach lets us know that all the players are part of the team's success.	1	2	3	4	5
29. My coach mainly uses rewards/praise to make players complete all the tasks he or she sets during training.	1	2	3	4	5
30. My coach encourages players to help each other learn.	1	2	3	4	5
31. My coach tries to interfere in aspect of players' lives outside of football.	1	2	3	4	5
32. My coach thinks it is important for players to play football because they (the players) enjoy it.	1	2	3	4	5
33. My coach favours some players more than others.	1	2	3	4	5
34. My coach encourages players to really work together as a team.	1	2	3	4	5

Multidimensional Moitvational Climate – Coach Perceptions

Empowering and Disempowering Motivational Climate Questionnaire-Coach (Appleton et al., under review)

All coaches have different coaching styles and behaviours. We would like to know more about your own coaching style with the team you have named above. Read each of the following statements carefully and respond to each in terms of ***how you normally interacted with the players on the team you named above during the last 3-4 weeks****.*

"On the team I named above…"	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. I encourage players to try new skills	1	2	3	4	5
2. I am less friendly with players if they don't make the effort to see things my way	1	2	3	4	5
3. I give my players choices and options	1	2	3	4	5
4. I try to make sure players feel good when they try their best	1	2	3	4	5
5. I substitute players when they make mistakes	1	2	3	4	5
6. I think it is important that players participate in their sport because they really want to.	1	2	3	4	5
7. I am less supportive of players when they are not training and/or playing well	1	2	3	4	5
8. I can really be counted on to care, no matter what happens	1	2	3	4	5
9. I give most of my attention to the best players	1	2	3	4	5
10. I yell at players for messing up	1	2	3	4	5
11. I ensure that players feel successful when they improve	1	2	3	4	5
12. I pay less attention to players if they have displeased me	1	2	3	4	5
13. I acknowledge players who try hard	1	2	3	4	5
14. I really appreciate players as	1	2	3	4	5

people, not just as footballers					
15. I only allow my players something they like to do at the end of training if they have done well during the session	1	2	3	4	5
16. I answer players' questions fully and carefully	1	2	3	4	5
17. I am less accepting of players if they have disappointed me	1	2	3	4	5
18. I ensure that each player contributes in some important way	1	2	3	4	5
19. I have my favourite players	1	2	3	4	5
20. I only reward my players with prizes or treats if they have played well	1	2	3	4	5
21. I only praise players who perform the best during the match	1	2	3	4	5
22. When I ask players to do something, I try to explain why this would be good to do so	1	2	3	4	5
23. I ensure everyone has an important role on the team	1	2	3	4	5
24. I shout at players in front of others to make them do certain things	1	2	3	4	5
25. I think that only the best players should play in a match	1	2	3	4	5
26. I threaten to punish players to keep them in line during training	1	2	3	4	5
27. I listen openly and do not judge players' personal feelings	1	2	3	4	5
28. I let all my players know that they are part of the team's success	1	2	3	4	5
29. I mainly use rewards/praise to make players complete all the tasks I set during training	1	2	3	4	5

30. I encourage players to help each other learn	1	2	3	4	5
31. I try to interfere in aspects of players' lives outside of football	1	2	3	4	5
32. I think it is important for my players to play football because they enjoy it	1	2	3	4	5
33. I favour some players more than others	1	2	3	4	5
34. I encourage my players to really work together as a team	1	2	3	4	5

Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press)

Part 1: For each specified time interval (i.e., 5/15 minutes), rate the extent to which the strategies employed by the coach reflected each of the 7 environment dimensions using the scale 0 (not at all) – 3 (strong potency) (use the marking scheme to inform your answer).

Context: Training / Match (circle as appropriate)

Environmental Dimension	Lower Order Strategies	Time			
	0 – Not At All 1 – Weak Potency 2 – Moderate Potency 3 – Strong Potency				
Autonomy Supportive An autonomy-supportive environment prevails when a coach attempts to identify and nurture their players' needs, interests and preferences, whilst encouraging them to take control over their own participation.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides meaningful choices				
	Provides a rationale for tasks, requests and constraints				
	Emphasises and encourages intrinsic task interest				
	Creates opportunities for input				
	Encourages initiative taking				
	Acknowledges feelings and perspective				
Controlling The environment created by the coach thwarts players' feelings of control by coercing and pressurising them to behave in a specific way.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Uses extrinsic rewards				
	Uses controlling language (want, need, must)				
	Intimidation (frightens with threats)				
	Negative conditional regard				
	Overt personal control				
	Devalues players' perspective				
Task-involving A task-involving climate prevails when the coach focuses on self-referenced criteria for success. In a task-involving climate the coach emphasises the importance of self-improvement, demonstrating task-mastery and exerting effort to achieve success.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Emphasises/recognises effort and/or improvement				
	Uses cooperative learning				
	Provides task-focused competence feedback				
	Explains role importance				
Ego-involving An ego-involving climate prevails when the coach focuses on other-referenced criteria for success. In an ego-involving climate the coach focuses on players outperforming one another and demonstrating high normative standards.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Punishes mistakes				
	Emphasises/recognises inferior/superior ability				
	Encourages inter/intra-team rivalry				
Relatedness Supportive Relatedness supportive and personally close social environments encourage feelings of care, acceptance, inclusion, trust and respect, and this is communicated in a warm, positive, consistent and non-contingent manner		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Ensures players are included in drills, activities, exercises				
	Engages in non-instructional conversation with players				
	Adopts a warm communication style				
	Shows care and concern for players				
	Shows unconditional regard				
Relatedness Thwarting A relatedness thwarting environment stop players' feeling a sense of relatedness (belonging). A relatedness-		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Excludes players from certain drills, activities, exercises				
	Restricts opportunities for interactions and conversation				

thwarting environment is likely to be cold, critical and marked by acceptance being contingent upon desirable behaviour.	Shows a lack of care and concern for players				
	Belittles (makes an attempt to embarrass) players				
	Adopts a cold communication style				
Structure A structured motivational climate is characterised by the coach providing players with information on organisation and performance, guidance and expectations for learning.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides instructions and organisation				
	Offers expectations for learning				
	Provides guidance throughout drills/activities/exercises				

Part 2: Rate the extent to which the coach was empowering and disempowering across the whole training session. Please circle your response on each scale (empowering & disempowering).

Empowering				**Disempowering**			
0	1	2	3	0	1	2	3
Not at all	Weak	Moderate	Strong	Not at all	Weak	Moderate	Strong

Multidimensional Motivational Climate Observation System Marking Scheme

At the end of each time interval (i.e., 5 minutes/15 minutes) please make a rating as to the extent to which the coach emphasised the 7 environmental dimensions.

Environmental Dimensions:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
- No strategies used by the coach	The coach may use one type of strategy The strategies may be used infrequently These could be used privately with a small number of players The coach may appear to use the strategies passively will little intention	The coach may use more than one type of strategy. These could be delivered to many of the players (privately or publicly to the whole group) These could be low/moderate intensity Importantly, the coach could do more to emphasise the dimension further	The coach clearly uses a variety of different strategies These strategies should impact upon the whole group (either through private delivery with many players or in public with the team) The coach will emphasise the dimension much more strongly and with greater intensity The coach could not do any more to emphasise the dimension further

Higher Order Rating:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
Overall the climate had no or almost no empowering or disempowering features.	The strategies employed by the coach may support/thwart one of the basic psychological needs (i.e. autonomy) The environment created could potentially support/thwart the other needs but this will be at a low level.	The strategies employed by the coach clearly support/thwart more than one of the basic needs The other need(s) could also be supported/thwarted but this will be less evident The environment could still be made more empowering/disempowering via the use of different strategies	The strategies employed by the coach and how they were delivered creates a climate likely to support/thwart all of the basic psychological needs and encourage task- or ego-focused conceptions of competence respectively. All of the needs are supported/thwarted by the strategies adopted by the coach

Behavioural Regulation in Sport Questionnaire (BRSQ; Lonsdale et al., 2008)

Please circle the appropriate number to indicate ***how well each of the reasons below indicates why you play football for this team****.*

I play football for this team…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. Because I enjoy it.	1	2	3	4	5
2. Because the benefits are important to me (e.g., developing as a player, getting fit, playing with my teammates).	1	2	3	4	5
3. Because I would feel guilty if I quit.	1	2	3	4	5
4. Because people push me to play.	1	2	3	4	5
5. To win the league trophy	1	2	3	4	5
6. But I question why I continue.	1	2	3	4	5
7. Because I like it.	1	2	3	4	5
8. Because I value the benefits (e.g., learning new football skills, being healthy, making friends etc).	1	2	3	4	5
9. Because I would feel ashamed if I quit.	1	2	3	4	5
10. To satisfy people who want me to play.	1	2	3	4	5
11. For the cups and medals.	1	2	3	4	5
12. But I question why I am playing this sport.	1	2	3	4	5
13. Because it is fun.	1	2	3	4	5
14. Because it teaches me self discipline.	1	2	3	4	5
15. Because I feel I must to	1	2	3	4	5

continue.					
16. Because I feel pressure from other people to play.	1	2	3	4	5
17. Because I want to receive awards (e.g., player of the match)	1	2	3	4	5
18. But I really don't know why anymore.	1	2	3	4	5
19. Because I find it exciting.	1	2	3	4	5
20. Because I learn things which are useful in my life.	1	2	3	4	5
21. Because I would feel like a failure if I quit.	1	2	3	4	5
22. Because if I don't other people will not be pleased with me.	1	2	3	4	5
23. But I wonder what's the point.	1	2	3	4	5

APPENDIX 3 Materials used in Chapter 4

Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press)

Part 1: For each specified time interval (i.e., 5/15 minutes), rate the extent to which the strategies employed by the coach reflected each of the 7 environment dimensions using the scale 0 (not at all) – 3 (strong potency) (use the marking scheme to inform your answer).

Context: Training / Match (circle as appropriate)

Environmental Dimension	Lower Order Strategies	Time			
	0 – Not At All 1 – Weak Potency 2 – Moderate Potency 3 – Strong Potency				
Autonomy Supportive An autonomy-supportive environment prevails when a coach attempts to identify and nurture their players' needs, interests and preferences, whilst encouraging them to take control over their own participation.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides meaningful choices				
	Provides a rationale for tasks, requests and constraints				
	Emphasises and encourages intrinsic task interest				
	Creates opportunities for input				
	Encourages initiative taking				
	Acknowledges feelings and perspective				
Controlling The environment created by the coach thwarts players' feelings of control by coercing and pressurising them to behave in a specific way.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Uses extrinsic rewards				
	Uses controlling language (want, need, must)				
	Intimidation (frightens with threats)				
	Negative conditional regard				
	Overt personal control				
	Devalues players' perspective				
Task-involving A task-involving climate prevails when the coach focuses on self-referenced criteria for success. In a task-involving climate the coach emphasises the importance of self-improvement, demonstrating task-mastery and exerting effort to achieve success.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Emphasises/recognises effort and/or improvement				
	Uses cooperative learning				
	Provides task-focused competence feedback				
	Explains role importance				
Ego-involving An ego-involving climate prevails when the coach focuses on other-referenced criteria for success. In an ego-involving climate the coach focuses on players outperforming one another and demonstrating high normative standards.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Punishes mistakes				
	Emphasises/recognises inferior/superior ability				
	Encourages inter/intra-team rivalry				
Relatedness Supportive Relatedness supportive and personally close social environments encourage feelings of care, acceptance, inclusion, trust and respect, and this is communicated in a warm, positive, consistent and non-contingent manner		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Ensures players are included in drills, activities, exercises				
	Engages in non-instructional conversation with players				
	Adopts a warm communication style				
	Shows care and concern for players				
	Shows unconditional regard				
Relatedness Thwarting		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3

A relatedness thwarting environment stop players' feeling a sense of relatedness (belonging). A relatedness-thwarting environment is likely to be cold, critical and marked by acceptance being contingent upon desirable behaviour.	Excludes players from certain drills, activities, exercises				
	Restricts opportunities for interactions and conversation				
	Shows a lack of care and concern for players				
	Belittles (makes an attempt to embarrass) players				
	Adopts a cold communication style				
Structure A structured motivational climate is characterised by the coach providing players with information on organisation and performance, guidance and expectations for learning.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides instructions and organisation				
	Offers expectations for learning				
	Provides guidance throughout drills/activities/exercises				

Part 2: Rate the extent to which the coach was empowering and disempowering across the whole training session. Please circle your response on each scale (empowering & disempowering).

Empowering				**Disempowering**			
0	1	2	3	0	1	2	3
Not at all	Weak	Moderate	Strong	Not at all	Weak	Moderate	Strong

Multidimensional Motivational Climate Observation System Marking Scheme

At the end of each time interval (i.e., 5 minutes/15 minutes) please make a rating as to the extent to which the coach emphasised the 7 environmental dimensions.

Environmental Dimensions:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
- No strategies used by the coach	The coach may use one type of strategy The strategies may be used infrequently These could be used privately with a small number of players The coach may appear to use the strategies passively will little intention	The coach may use more than one type of strategy. These could be delivered to many of the players (privately or publicly to the whole group) These could be low/moderate intensity Importantly, the coach could do more to emphasise the dimension further	The coach clearly uses a variety of different strategies These strategies should impact upon the whole group (either through private delivery with many players or in public with the team) The coach will emphasise the dimension much more strongly and with greater intensity The coach could not do any more to emphasise the dimension further

Higher Order Rating:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
Overall the climate had no or almost no empowering or disempowering features.	The strategies employed by the coach may support/thwart one of the basic psychological needs (i.e. autonomy) The environment created could potentially support/thwart the other needs but this will be at a low level.	The strategies employed by the coach clearly support/thwart more than one of the basic needs The other need(s) could also be supported/thwarted but this will be less evident The environment could still be made more empowering/disempowering via the use of different strategies	The strategies employed by the coach and how they were delivered creates a climate likely to support/thwart all of the basic psychological needs and encourage task- or ego-focused conceptions of competence respectively. All of the needs are supported/thwarted by the strategies adopted by the coach

APPENDIX 4: Materials used in Chapter 5

Multidimensional Motivational Climate Observation System (MMCOS; Smith et al., in press)

Part 1: For each specified time interval (i.e., 5/15 minutes), rate the extent to which the strategies employed by the coach reflected each of the 7 environment dimensions using the scale 0 (not at all) – 3 (strong potency) (use the marking scheme to inform your answer).

Context: Training / Match (circle as appropriate)

Environmental Dimension	Lower Order Strategies	Time			
	0 – Not At All 1 – Weak Potency 2 – Moderate Potency 3 – Strong Potency				
Autonomy Supportive An autonomy-supportive environment prevails when a coach attempts to identify and nurture their players' needs, interests and preferences, whilst encouraging them to take control over their own participation.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides meaningful choices				
	Provides a rationale for tasks, requests and constraints				
	Emphasises and encourages intrinsic task interest				
	Creates opportunities for input				
	Encourages initiative taking				
	Acknowledges feelings and perspective				
Controlling The environment created by the coach thwarts players' feelings of control by coercing and pressurising them to behave in a specific way.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Uses extrinsic rewards				
	Uses controlling language (want, need, must)				
	Intimidation (frightens with threats)				
	Negative conditional regard				
	Overt personal control				
	Devalues players' perspective				
Task-involving A task-involving climate prevails when the coach focuses on self-referenced criteria for success. In a task-involving climate the coach emphasises the importance of self-improvement, demonstrating task-mastery and exerting effort to achieve success.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Emphasises/recognises effort and/or improvement				
	Uses cooperative learning				
	Provides task-focused competence feedback				
	Explains role importance				
Ego-involving An ego-involving climate prevails when the coach focuses on other-referenced criteria for success. In an ego-involving climate the coach focuses on players outperforming one another and demonstrating high normative standards.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Punishes mistakes				
	Emphasises/recognises inferior/superior ability				
	Encourages inter/intra-team rivalry				
Relatedness Supportive Relatedness supportive and personally close social environments encourage feelings of care, acceptance, inclusion, trust and respect, and this is communicated in a warm, positive, consistent and non-contingent manner		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Ensures players are included in drills, activities, exercises				
	Engages in non-instructional conversation with players				
	Adopts a warm communication style				
	Shows care and concern for players				
	Shows unconditional regard				
Relatedness Thwarting		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3

A relatedness thwarting environment stop players' feeling a sense of relatedness (belonging). A relatedness-thwarting environment is likely to be cold, critical and marked by acceptance being contingent upon desirable behaviour.	Excludes players from certain drills, activities, exercises				
	Restricts opportunities for interactions and conversation				
	Shows a lack of care and concern for players				
	Belittles (makes an attempt to embarrass) players				
	Adopts a cold communication style				
Structure A structured motivational climate is characterised by the coach providing players with information on organisation and performance, guidance and expectations for learning.		0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
	Provides instructions and organisation				
	Offers expectations for learning				
	Provides guidance throughout drills/activities/exercises				

Part 2: Rate the extent to which the coach was empowering and disempowering across the whole training session. Please circle your response on each scale (empowering & disempowering).

Empowering				**Disempowering**			
0	1	2	3	0	1	2	3
Not at all	Weak	Moderate	Strong	Not at all	Weak	Moderate	Strong

Multidimensional Motivational Climate Observation System Marking Scheme

At the end of each time interval (i.e., 5 minutes/15 minutes) please make a rating as to the extent to which the coach emphasised the 7 environmental dimensions.

Environmental Dimensions:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
- No strategies used by the coach	The coach may use one type of strategy The strategies may be used infrequently These could be used privately with a small number of players The coach may appear to use the strategies passively will little intention	The coach may use more than one type of strategy. These could be delivered to many of the players (privately or publicly to the whole group) These could be low/moderate intensity Importantly, the coach could do more to emphasise the dimension further	The coach clearly uses a variety of different strategies These strategies should impact upon the whole group (either through private delivery with many players or in public with the team) The coach will emphasise the dimension much more strongly and with greater intensity The coach could not do any more to emphasise the dimension further

Higher Order Rating:

0 – NOT AT ALL	1 – WEAK POTENCY	2 – MODERATE POTENCY	3 – STRONG POTENCY
Overall the climate had no or almost no empowering or disempowering features.	The strategies employed by the coach may support/thwart one of the basic psychological needs (i.e. autonomy) The environment created could potentially support/thwart the other needs but this will be at a low level.	The strategies employed by the coach clearly support/thwart more than one of the basic needs The other need(s) could also be supported/thwarted but this will be less evident The environment could still be made more empowering/disempowering via the use of different strategies	The strategies employed by the coach and how they were delivered creates a climate likely to support/thwart all of the basic psychological needs and encourage task- or ego-focused conceptions of competence respectively. All of the needs are supported/thwarted by the strategies adopted by the coach

Multidimensional Motivational Climate – Coach Perceptions

Empowering and Disempowering Motivational Climate Questionnaire-Coach

All coaches have different teaching styles and behaviours. We would like to know more about your own coaching style with the players on your football team. Read each of the following statements carefully and respond to each in terms of how you normally interacted ***with the players during today's coaching session.***

"**During today's session…"**	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I encouraged players to try new skills.	1	2	3	4	5
2. I was less friendly with players if they didn't make the effort to see things my way.	1	2	3	4	5
3. I gave my players choices and options.	1	2	3	4	5
4. I tried to make sure players felt good when they tried their best.	1	2	3	4	5
5. I didn't select players for the best roles if they made mistakes.	1	2	3	4	5
6. I thought it was important that players participated in football because they really want to.	1	2	3	4	5
7. I was less supportive of players when they were not practicing and/or performing well.	1	2	3	4	5
8. I could really be counted on to care, no matter what happened.	1	2	3	4	5
9. I gave most of my attention to the best players.	1	2	3	4	5
10. I yelled at players for messing up.	1	2	3	4	5
11. I ensured that players felt successful when they improved.	1	2	3	4	5
12. I paid less attention to players if they had displeased me.	1	2	3	4	5
13. I acknowledged players who tried hard.	1	2	3	4	5
14. I really appreciated players as people, not just as players.	1	2	3	4	5
15. I only allowed my players to do something they liked to do at the end of the session if they had done well during the session.	1	2	3	4	5

16. I answered players' questions fully and carefully.	1	2	3	4	5
17. I was less accepting of players if they had disappointed me.	1	2	3	4	5
18. I ensured that each player contributed in some important way.	1	2	3	4	5
19. I had my favourite players.	1	2	3	4	5
20. I only rewarded my players with prizes or treats if they had performed well.	1	2	3	4	5
21. I only praised players who perform the best.	1	2	3	4	5
22. When I asked players to do something, I tried to explain why this would be good to do so.	1	2	3	4	5
23. I ensured everyone had an important role on the team.	1	2	3	4	5
24. I shouted at players in front of others to make them do certain things.	1	2	3	4	5
25. I thought that only the best players should be on the team.	1	2	3	4	5
26. I threatened to punish players to keep them in line during the session.	1	2	3	4	5
27. I listened openly and did not judge players' personal feelings.	1	2	3	4	5
28. I let all my players know that they are part of the success of the team.	1	2	3	4	5
29. I mainly used rewards/praise to make players complete all the tasks I set during the session.	1	2	3	4	5
30. I encouraged players to help each other learn.	1	2	3	4	5
31. I tried to interfere in aspects of players' lives outside of football.	1	2	3	4	5
32. I thought that it was important for my players to play football because they enjoyed it.	1	2	3	4	5
33. I favoured some players more than others.	1	2	3	4	5
34. I encouraged my players to really work together as a team.	1	2	3	4	5