

MOTIVATIONAL FACTORS, WELL-BEING AND OPTIMAL
FUNCTIONING IN TEAMS

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ABSTRACT

Grounded in Basic Psychological Needs Theory (BNT; Deci & Ryan, 2000) and integrating theory from the group dynamics literature (i.e., team cohesion; Carron, 1982) this thesis extended current understanding of the determinants of optimal functioning in elite youth athletes and teams. The studies aimed to highlight the roles of task and social cohesion as antecedents and outcomes of basic psychological needs satisfaction (BPNS) in teams and provided supporting evidence of structural invariance across elite and non-elite competitive levels in hockey players. A team-referenced examination of the tenets of BNT in teams was supported providing a novel approach to the conceptualisation of optimal functioning in teams. The mediating role of BPNS in the relationships between the targeted dimensions provided further information explicating the differing associations between the BNT-related variables between and within teams. The need for competence was found to mediate relationships between the coach-created environment and well- and ill-being outcomes. Finally, grounded in BNT (Deci & Ryan, 1985; 2000), the examination of rugby players' perceptions of the autonomy features on the coach-created climate, need satisfaction, and players' affective responses (i.e., negative affect) revealed that autonomy support was negatively associated with mean rates of change in levels of negative affect over time. These changes included a decrease in levels of negative affect over the first five days and an increase over the weekend. Overall the empirical chapters in this thesis provided a systematic examination of the BNT-assumed processes that extends knowledge beyond conceptualisation and measurement of athletes' perceptions with a particular focus on examining these relationships for youth athletes as they are operating within elite and non-elite teams.

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PAPERS AND CONFERENCES

During the course of my doctoral research within the School of Sport, Exercise and Rehabilitation Sciences at the University of Birmingham, the following articles and conference abstracts were accepted for publication and/or presentation at conferences.

Secondary authors who advised on study design, data analysis and paper editing have also been listed.

Under Review

Merrett, C.K., Duda, J.L., & Quested, E. (2016). Perceived coaching environment, need satisfaction, and well-being in elite hockey players: Athletes' perspectives of the views held by their team.

Merrett, C.K., Duda, J.L., & Appleton, P.R. (2016). The role of team cohesion in the relationships between the coaching environment, the psychological needs, and well-being and ill-being in youth hockey players.

In Preparation

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Merrett, C.K., Duda, J.L., & Quested, E. (2016). Daily fluctuations in perceived motivation, well-being, and team cohesion in elite rugby players.

Conference Presentations

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Merrett, C.K., Duda, J.L., & Quested, E. (2011). Team-referenced perceived coaching environment, needs satisfaction, and well-being in elite hockey players: An extension of basic needs theory. Congress of European College of Sport Science, Liverpool, UK. July 6th-9th, 2011 (oral presentation)

Merrett, C.K., Duda, J.L., & Quested, E. (2012). Coaching environment and cohesiveness: satisfying needs, and fostering well-being in youth hockey players. Congress of European College of Sports Science, Bruges, Belgium. July 4th-7th, 2012 (oral presentation)

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CHAPTER 1

GENERAL INTRODUCTION

Concerns regarding the sustained engagement of young people in sport have long been expressed by organisations invested in the development of elite athletes (Rowe, 2012). Ten thousand hours of training over ten years has been proposed as the required target for the optimal development of elite athletes to attain world class performance levels (Ericsson & Charness, 1994). Unfortunately it is the case that young athletes at this critical stage in their development fail to optimise and maintain their engagement in sport. As a result, it is important to understand the key components that influence the sustaining of motivation in the development of talented athletes (Baker, Horton, Robertson-Wilson, & Wall, 2003; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Research has pointed towards increasing understanding of what enhances the quality of training as an important predictor of athletic attainment as well as maintaining the necessary quantity of training hours to achieve optimal performance (Fletcher & Wagstaff, 2009). Furthermore, awareness of the factors which enable athletes to prosper and achieve their potential rather than experience compromised well-being and drop out, is of importance regardless of whether athletes are participating at an elite or recreational standard (Duda et al, 2013).

The social environment surrounding young athletes, and the coach-created environment in particular, has consistently been highlighted as one of the most influential contributors to the quality of athlete motivation and healthy participation (Duda & Balaguer, 2007; Ntoumanis, 2012). Coaches and other members of the athlete development team make a contribution in assisting a positive transition from youth sport to the standards of professionalism required in elite and senior level sport (Larsen, Henriksen, Alfermann & Christensen, 2014). The large body of literature supporting the role of the social environment in fostering adaptive or maladaptive motivational processes and the healthy development of young athletes has tended to focus on what may impact the welfare of athletes as individuals

within individual or team sports (Duda, Papaioannou, Appleton, Quested, & Krommidas, 2014). Evidence clearly supports the role of coaches in regard to youth athletes' development of performance anxiety (Smith, Smoll, & Cumming, 2007), perfectionistic perceptions and behaviours (Mallinsen & Hill, 2011) and feelings of self-confidence (Machida, Ward, & Vealey, 2012), enjoyment (Smith, Smoll, Barnett, & Everett, 1993) and self-esteem (Papaioannou et al, 2013).

In order to be able to advise coaches, educators, parents, mentors and other people working with young athletes in the community and elite sport, there is a need to develop greater insight into how the interactions of “significant others” (i.e. coaches, educators, parents, and mentors) with young athletes in team settings in particular contribute to the maintenance of healthy participation and optimal functioning (Langan, Blake, & Lonsdale, 2013). This information is needed in order to be able to educate professionals working in these settings about how their behaviours impact upon young athletes' sustained participation in their sport and ultimately the realisation of their potential as athletes.

The following sections of this chapter outline the rationale for an approach that draws from social cognitive theories of motivation in an attempt to examine the potential impact of the social environment and related motivational processes and indicators of overall functioning with a particular emphasis on youth athlete participation in team sports settings. Definitions of “team” and the concept of interdependence are introduced in support of the integration of group dynamics constructs (i.e., team cohesion) within contemporary theories of motivation. Contemporary and popular theories from the contemporary motivation literature are reviewed, with a particular emphasis on how these theoretical concepts provide insight into variability in athletes' experiences of well-being and optimal functioning. The

unique conceptual and methodological challenges surrounding team-related research are discussed and finally, the specific aims of this thesis are presented.

Introducing the Concept of “Team” and Interdependence

The definition of “team” within a work context has been described as “... a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal / objective / mission, who have been assigned specific roles or functions to perform, and who have a limited lifespan of membership” (Salas, Dickinson, Converse, & Tannenbaum, 1992, p 4). Within the sport-related literature, a “team” is defined by a collection of individuals who ‘...share a common fate, exhibit structured patterns of interaction and communication, hold common perceptions of group structure, are personally and instrumentally interdependent, reciprocate interpersonal attraction, and consider themselves to be a group’ (Carron, Hausenblas, & Eys, 2005, p 13).

Although there are likely to be distinct differences between teams as manifested in sports compared to work organisations, common to both definitions within the organisational and sports psychology literature is the pervading reference to interdependence and the experience of “sharedness” between team members. Interdependence is a concept capturing the “degree and manner in which group members rely on one another and require reciprocal interaction” (Johnson & Johnson, 2005, In Evans, Eys & Bruner, 2012 p303). In sports involving high levels of interaction and extensive team play (such as hockey, football, and rugby), the greater feelings of “closeness” between players and the greater degree of reciprocal interaction between members, is likely to lead to feelings and perceptions within the group being shared (Spink, Nickel, Wilson, & Odnoken, 2005; Evans, Eys, Bruner & Kleinert, 2014, p.514; Evans et al, 2012). These shared feelings and perceptions that can arise are assumed to be a function of an emotionally contagious atmosphere that leads to a “ripple

effect” amongst members of the same team (Barsade, 2002; Totterdell, 2000; Campo, Mellalieu, Ferrand, Martinet, & Rosnet, 2012). Conceptually it is likely that the quality of motivation and feelings of well-being experienced by members of the same team will be influenced by this degree of “closeness” and this may also have implications for the experiences of the team as a whole. Alternatively, it is also conceptually viable that when team athletes are feeling motivated and enjoying their participation in sport there are likely to experience this “closeness” to a greater extent. In the group dynamics literature, team cohesion has been identified as a key influence on interpersonal relationships within team environments and is also a construct that captures feelings of “closeness” within teams (Evans, Eys, & Wolf, 2013).

The Role of Team Cohesion Within Team Sports

Cohesion is a multidimensional construct that includes facets of both task and social cohesion. Cohesion has been defined as a dynamic process “that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives” (Carron, 1982, p124). The degree to which members of a group work together to achieve common goals is endemic to task cohesion. Social cohesion is reflected by the degree to which members of a team like each other and enjoy one another’s company (Carron, Brawley, & Widmeyer, 1998). Studies have indicated that teams with high task and social cohesion have been found to be more likely to exhibit positive sport performance (Carron, Colman, Wheeler, & Stevens, 2002; Carron, Bray, & Eys, 2002). Team cohesion has been one of the most frequently studied of the group dynamics constructs (Pescosolido & Saavedra, 2012). Despite evidence supporting positive implications of cohesion with in team sports, there is less attention given to how and the degree to which team cohesion may influence the extent to which teams and players within those teams have feelings of well-being. There is also a

dearth of information regarding the degree to which cohesion may be relevant to how well the team functions as a whole unit. It is possible that high levels of team cohesion may play both a positive and a negative role with regards to motivation and team functioning.

Contemporary Theories of Motivation

Early conceptualisations of “motivation” tended to centre on the level of effort and energy invested in a specific targeted behaviour (Ryan & Deci, 2000b). However, this definition of “motivation” has been found to be limited as it does not account for different types of motivation, why individuals choose to behave or move in particular ways or how that behaviour is regulated (Roberts, 1992). A qualitative perspective on motivation aims to explain the underlying processes and reasons as to “why” individuals choose to act in a particular way and to provide a better indication as to whether this motivation is likely to be sustainable over a longer period of time and conducive to well-being.

Much of the sport literature grounded in contemporary motivational psychology has been grounded in self-determination theory (SDT; Deci & Ryan, 1985) and achievement goal theory (AGT; Ames, 1992). The development of SDT begins by “embracing the assumption that all individuals have natural, innate, and constructive tendencies to develop an ever more elaborated and unified sense of self” (Deci & Ryan, 2002). Fundamental to SDT is that the varying quality of motivation experienced by individuals can be identified along a continuum ranging from intrinsic motivation (i.e., individuals are engaged in behaviours because they are interesting and enjoyable) at one end to extrinsic motivation (i.e., individuals are moved to behave because it leads to a separable outcome) at the other (Deci & Ryan, 2000).

A sub-theory of SDT has been formalised called basic psychological needs theory (BNT). BNT extends the conceptualisation of quality motivation further by exploring the importance

of three basic psychological needs (BPNs) in the development of psychological well-being and optimal functioning (Ryan & Deci, 2000). BNT assumes that the BPNs for autonomy, competence, and relatedness are fundamental for the nurturance and growth of positive mental health and this is associated with the extent to which individuals are fully functioning (Ryan & Deci, 2000a, 2002). It is considered human nature to strive for BPNs as an inherent requirement for optimal functioning (Deci & Ryan, 2000). The tenets of BNT have been supported across varying contexts, cultures, and gender (Deci & Ryan, 2000; Deci, Ryan, Gagne, Leone, Usunov, & Kornazheva, 2001; Taylor & Lonsdale, 2010; Quested, Duda, Ntoumanis, & Maxwell, 2013; Schuler, Brandstatter & Sheldon, 2012), and across numerous domains (Milyavskaya & Koestner, 2011). Thus, if BNT is truly universal, we would also expect the hypothesised associations between constructs endemic to this theory to hold across different sport settings i.e., individual and team sports.

The satisfaction of the need for autonomy is realized when individuals feel that they have some choice and they are the initiator of their own actions, and when these actions are in accordance with an individual's values without excessive control from external influences and internal pressures (De Charms, 1968). Within a team sport setting, the experience of autonomy may be evidenced when players are supported to act in accordance with their shared team values and beliefs, and when they are given collective choice and ownership over the organization and direction of their training sessions.

The satisfaction of the need for competence is fulfilled by the experience that one can effectively bring about desired effects and outcomes (White, 1959). Teams that demonstrate collective competence may have shared feelings in their ability to bring about desired performance outcomes during training and competition. White (1959) also theorised that feeling competent is an integral contributor to self-confidence and is also closely linked to

feelings of self-efficacy (Bandura, 1986). The assessment of collective efficacy across the organisational, educational, and sport domains can be considered has formed much of the research investigating group or team-referenced competence (Goddard, 2002; Magyar, Feltz & Simpson, 2004). Collective efficacy is defined as “a group’s shared belief of the group’s capabilities to succeed at a given task” (Bandura, 1986).

Finally, satisfaction of the need for relatedness describes the perceived experience of feeling connected to, cared for, valued and understood by others (Baumeister & Leary, 1995). The extent to which an individual team member feels valued, supported, and cared for by the coach is likely to be an important determinant of both individual functioning, but may also have implications for overall team functioning (Carron, et al, 2002; Blanchard, Amiot, Perreault, & Vallerand, 2009).

In contrast, more disempowering (Duda, 2013) environments where controlling coach behaviours are more prevalent have been linked to the active obstruction or undermining of the BPNs, referred to as basic psychological need thwarting (BPNT; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011). Thwarting of the BPNs has corresponded to more controlled behavioral engagement and associated with a number of maladaptive outcomes such as depression, negative affect, eating disorders (Bartholomew et al, 2011), performance anxiety (Smith, et al, 2007), low self-esteem (Papaioannou et al, 2013), burnout (Lonsdale, Hodge, & Rose, 2009), and drop out from their sport altogether (Quested, et al, 2013).

The Social Context and Basic Psychological Needs

The extent to which athletes experience adaptive or maladaptive health outcomes is largely determined by the degree to which an athlete’s BPNs are satisfied or thwarted

respectively (Deci & Ryan, 2000). The degree to which the coach-created environment is autonomy supportive or controlling in competitive contexts is considered particularly influential in either satisfying or thwarting the BPNs (Balaguer et al, 2012). An autonomy supportive coaching behavioural style is characterised by the coach providing athletes a clear rationale for training and competition related tasks and task-focused feedback on performance. Coaches seek to understand and acknowledge athletes' feelings whilst also allowing athletes a choice, and a role in decision-making (Mageau & Vallerand, 2003). Autonomy supportive coaching has consistently been found to promote the satisfaction of athletes' basic psychological needs in the SDT sport literature (Amorose & Andersson-Butcher, 2007). Athletes are more likely to have their psychological needs for relatedness satisfied when coaches actively seek to understand and acknowledge athletes' feelings. An autonomy supportive approach to coaching has also been associated with satisfaction of athletes' need for competence (Mageau & Vallerand, 2003). It makes sense that when athletes are given the opportunity to input and make choices regarding their engagement, have their views considered, and are provided with rationales for why they may need to do certain things, they will feel more competent.

In contrast to conditions that support the satisfaction of the BPNs, the assessment of controlling behaviours demonstrated by coaches has typically been used to capture the stifling influence of the social environment on athletes' well-being (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010a). In the development of the controlling coach behaviour scale, Bartholomew and colleagues considered the extent to which coaches' behaviours are characterised by the controlling use of rewards, negative conditional regard, intimidation, and excessive personal control (Bartholomew et al, 2010a). Controlling coach-created environments have not only been found to undermine athletes' basic need satisfaction but

have also been strongly linked to the thwarting of need satisfaction (Bartholomew et al, 2011; Balaguer et al, 2012).

Recent studies simultaneously examining controlling and autonomy supportive features of the coach-created environment and their influence on BPN satisfaction or thwarting, have revealed that these environmental constructs are not at extreme ends of a bipolar continuum but rather most social environments will consist of elements of both dimensions (Ommundsen, Lemyre, Abrahamsen & Roberts, 2010; Smith, et al, 2013; Balaguer et al, 2012). The extent to which features of the coach-created environment are perceived as more adaptive (i.e., a greater proportion of positive elements such as autonomy supportive coach behaviours) as opposed to maladaptive (i.e., characterised by controlling coach behaviours) will determine the degree to which an athlete's BPNs are satisfied or thwarted. This in turn will predict the extent to which individuals experience positive or negative behavioural and psychological health outcomes (Ommundsen et al 2010; Balaguer et al, 2012).

Basic Psychological Needs Satisfaction, Well-Being and Optimal Functioning

Within the SDT literature, Deci and Ryan (2000) define well-being more broadly than the experience of positive and negative psychological states. They propose that well-being is better characterized by the extent to which a person is fully functioning (Deci & Ryan, 2000) and is likely to be achieved through behaviours that are congruent to an individual's authentic self (Sheldon & Elliot, 1999) as well as via the pursuit of activities that are meaningful (McGregor & Little, 1998). Originating from Aristotle, eudaimonia encompasses the quality of lived experiences (Waterman, 1993). Eudaimonic well-being is demonstrated by individuals who seek out ways to satisfy the basic psychological needs for competence,

relatedness, and autonomy (Deci & Ryan, 2000). The experience of psychological well-being, and eudaimonic well-being in particular, have been used as a general gauge of an individual's overall positive condition and as an indicator of the extent to which an individual is flourishing (Keyes, 2002) or fully functioning (Ryff & Singer, 1998; Spreitzer, Sutcliffe, Dutton, Sonenshien & Grant, 2005). When individuals feel that they are fully functioning (or optimally functioning), in a sporting context it is likely that this experience of aliveness and energy may also enhance athletes' overall performance. In addition, a healthy and optimally functioning athlete is also more likely to sustain levels of performance over longer periods of time with lesser risk of feelings of emotional exhaustion.

SDT-based research in sport have assessed reported levels of vitality (Ryan & Frederick, 1997), self-esteem (Marsh, Richards, Johnson, Roche, & Tremayne, 1994), positive and negative affective states (Watson, Clark, & Tellegen, 1988), and life satisfaction (Diener, Emmons, Larson, & Griffin, 1985) as indicators of psychological well-being. However, in both individual and team athletes, positive feelings of aliveness and energy have been considered a primary indicator of the experience of eudaimonic well-being and positive functioning and has typically been assessed through perceptions of subjective vitality (Ryan & Frederick, 1997; Gagne, Ryan, & Bargman, 2003; Reinboth & Duda, 2006; Adie, Duda, & Ntoumanis, 2008; Vlachopoulos & Karavani, 2009). The extent to which individuals experience these feelings of energy and aliveness are considered to be indicative of levels of optimal functioning. Conversely, negative psychological outcomes and diminished levels of functioning have been found to be manifested in situations where the BPNs have not been supported or have been actively thwarted (Balaguer et al, 2012). For example, maladaptive or negative psychological and behavioural outcomes have been indicated through the experience of burnout in elite adult athletes (Hodge, Lonsdale, & Ng, 2008; Lonsdale, Hodge & Rose,

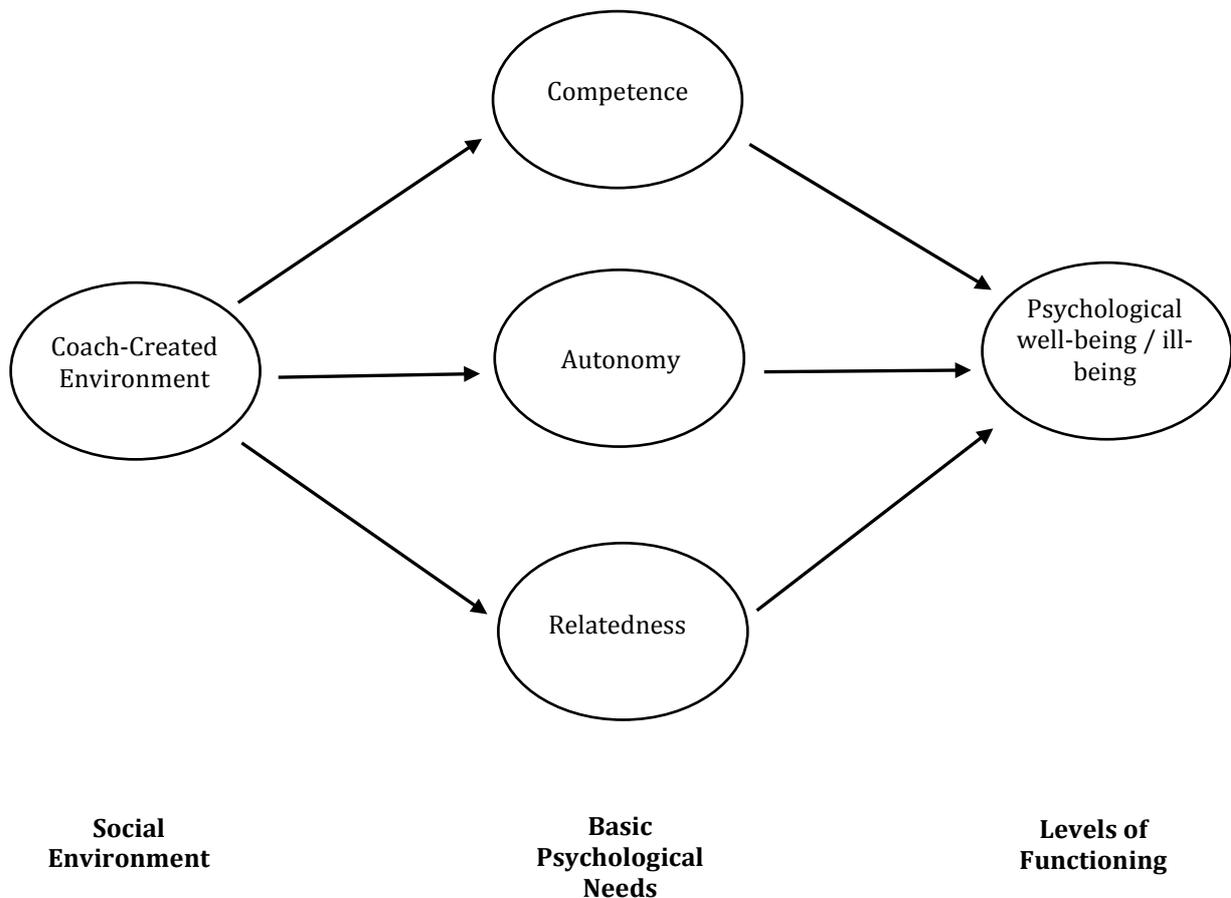
2009) and young footballers (Balaguer, et al, 2012), negative affect (Balaguer et al, 2012), aggressive or immoral sport behaviour during their sport participation (Miller, Roberts, & Ommundsen, 2005), and drop out from their sport altogether (Sarrazin et al, 2002).

These associations between satisfaction and thwarting of the BPNs with psychological well-being outcomes have been examined at the individual level where participants have been asked to reflect upon self-referenced perceptions of the social environment, their own BPN satisfaction (BPNS) and BPN thwarting (BPNT), and well-being (Ommundsen et al, 2010; Quested et al, 2013). With a large proportion of adolescent sports participation taking place within team sports settings, the exploration of these relationships where well-being is referenced to the group/team as a whole seems particularly pertinent. As mentioned earlier in this chapter, in team sports where high levels of interdependence are evident, there are likely to be greater feelings of “closeness” between players thus resulting in feelings between team members being shared (Spink, Nickel, Wilson, & Odnoken, 2005).

Team Cohesion and Basic Psychological Needs Theory

To date, only one study has considered the role of cohesion within the BNT framework. Blanchard et al (2009) found that perceptions of cohesiveness predicted the satisfaction of the BPNs of team sport athletes when testing a BNT-grounded process model. In turn, BPNS predicted greater self-determination in basketball participation and ensuing positive satisfaction and emotions. Within the organisational psychology literature it has been suggested that high task-interdependence in work teams may buffer against the effects of negative relationships on team performance (de Jong, Curseu, & Leenders, 2014). This work suggests that teams with high task cohesion may also be able to reduce the maladaptive effects of negative experiences within the team (de Jong et al, 2014; social independence

Figure 1.1. *The Basic Needs Theory framework (Deci & Ryan, 1985; 2000).*



theory; SIT; Johnson & Johnson, 2005). Both these studies highlight the potential role that cohesion, and task cohesion in particular, may play in fostering healthy psychological team environments that not only have a positive effect on the development of adaptive well-being outcomes, but may also serve to buffer the effects of negative experiences and emotions.

It is also reasonable to expect that players will experience increased feelings of affiliation and “belongingness” (Baumeister & Leary, 1995) in social environments where coaches of team sports support the satisfaction of players’ basic needs. The greater sense of interdependence gained through satisfaction of their BPNs within the team may lead to players behaving in more cooperative ways towards other team members (Brawley, et al,

1988; Heuze, Raimbault, & Fontayne, 2006). Players are also more likely to engage in cooperative behaviour with regards to team tasks when enabled to act more-volitionally and when provided with meaningful choice. Feelings of confidence in their ability as team players may more likely lead to players cooperating with team members for the benefit of the team as a whole.

A review of the existing literature indicates a dearth of attention devoted to examining the role of cohesion within the SDT (or more specifically, BPNT) sequence. It is likely that feelings of “closeness” between team members may be both a precursor and also a consequence of BPNS. Thus, research combining the examination of BNT-related processes and team cohesion seem important if we are to develop a greater understanding of factors that contribute to the psychological health and optimal functioning of team sports participants (Duda & Balaguer, 2007; Balaguer et al, 2012; Spink et al, 2005).

Conceptual and Methodological Issues in Testing BNT in Teams

With a focus on the functioning of groups within occupational, sport, health care and other settings (Duda & Balaguer, 2007), researchers have looked towards developing the most valid and reliable methods for examining relationships within and between teams and their concomitants. Much of the existing research examining motivation and its correlates in athletes participating on team sports has failed to acknowledge that constructs shared by members of the same team and determined as operating at the group-level, should also be analysed at the group level. Group dynamics based constructs, such as collective efficacy (Short et al, 2005) and team cohesion (GEQ; Widmeyer et al, 1995) conceptually been considered team level attributes. However, their measurement has often been at the individual level with item content referenced for the team as a whole (i.e., collective efficacy,

Feltz & Lirgg, 1998). Similarly, in a team or group setting it is possible that the shared experience of the social environment within the group may also be extended to shared feelings of needs satisfaction and well-being and ill-being (Karreman, Dorsch, & Riemer, 2009). It is feasible that players within teams will have a view of what the team is experiencing in regard to collective feelings of competence, autonomy and relatedness, and well-being for the team as a whole but this has not yet been examined within the SDT and group dynamics based sport literature.

As discussed earlier, a contagious effect may occur within team settings where the highly interdependent relationships between members may result in shared feelings or emotions that will influence individual player feelings (Barsade, 2002). In addition, situations where features of the social environment are very strong, it is possible that individual player perceptions of their team atmosphere within a particular team will influence and possibly override individual perceptions of their own individual climate (Duda, 2001).

With these methodological and conceptual considerations in mind, it therefore seems appropriate to separate individual and group effects in any analyses exploring social environmental and motivational processes within teams (Duda, 2001; Karreman, et al, 2009; Ludke, Robitzsch, Trautwein, & Kunteret, 2009; Marsh, et al, 2012). As a result, multi-level modelling has become an established method for analysing relationships at multiple levels in group and team contexts. In addition to there being limited research exploring the BNT variables at both the individual and group levels, over the years very few studies examining group dynamics factors (such as team cohesion) have acknowledged that individuals are nested within teams and thus require multi-level analyses (Spink et al, 2005). It would also seem interesting to explore team athletes' perceptions of the social environment, basic needs satisfaction or thwarting, and well- and ill-being as realised for their team as a whole.

Keys Aims of the Thesis

The relationships between the coach-created environment, BPNS, and well- and ill-being outcomes have received considerable support when referenced to the individual athlete and analysed at the individual level of analysis. Furthermore despite strong support for the links between group dynamics constructs such as team cohesion with team functioning and performance, there has been a scarcity of attention directed towards understanding the underlying motivational mechanisms and optimal functioning for teams themselves within team sport settings. Much of the existing SDT research focuses on recreational sports participation in children and adolescents (e.g., Quested et al, 2013). However, with the increasing physical and psychological demands of training and competition placed on our aspiring youth elite athletes, it is important to study the interrelationships between social environmental factors, motivational processes and indicators of optimal or compromised functioning in this population.

So that it is more likely that they achieve their athletic potential, the sustainability of engagement and the maintenance of optimal physical and mental functioning are important factors to consider for those involved in the development of young elite athletes. Research is needed which not only continues to explore those factors that contribute to individual functioning, but also those social environmental and motivation-related determinants of optimal functioning of the team or squad of players as a whole unit. The following chapters aim to address these gaps in the literature by providing a systematic examination of the tenets of BNT when the variables are considered conceptually, methodologically and analytically from the perspective of individual players participating within sports team settings.

In study one, we tested two theory-informed models integrating task and social cohesion within the BNT sequence to increase our understanding of the role of these group

dynamics constructs as potentially both antecedents and as outcomes of BPNS. In this study we also examined invariance between elite and non-elite hockey players in the hypothesised relationships between autonomy supportive and controlling features of the coach-created environment, dimensions of team cohesion (i.e., task and social cohesion), BPNS (i.e., autonomy, relatedness to teammates, competence), and indicators of well-being (i.e., subjective vitality) and ill-being (i.e., physical and emotional exhaustion), task and social cohesion. This study aimed to test Deci and Ryan's (2000) universality hypothesis by establishing whether similar relationships between variables are operating equivalently across different competitive levels.

In study two, we attempted to explore the BNT sequence when all variables were referenced with respect to the team as a whole. The main purpose of this study was to establish whether a team-referenced approach to capturing the variables within the BNT is supported. The conceptualization of the BPNs and well- and ill-being indices as team-referenced variables provides a novel approach to testing the tenets of BNT in the case of team sport athletes. Consistent with existing BNT research, in this study we also tested the theoretically assumed mediating role of BPN satisfaction in the relationship between the targeted dimensions of the coaching environment and the targeted team-referenced well- and ill-being outcomes.

Study three provides a cross-sectional and multi-level examination of player perceptions of the coach-created environment, BPNS, and well-being when captured between and within hockey teams. The theoretically assumed mediating role of BPNS in the relationships between the targeted dimensions was also examined. One of the major strengths of this study was that we were able to calculate the separate effects within and between teams thus highlighting differing associations between the BNT-related variables between and

within teams. Consistent with study one we also explored task cohesion as both an antecedent and an outcome within the BNT sequence, albeit in this study we were also able to examine the relationships with task cohesion at multiple levels.

Building on the findings from the cross-sectional data analysed in previous studies, the final study in this thesis involved a week long day-to-day repeated measures examination of changes in perceptions of an autonomy supportive coach-created environment, task cohesion, BPNS, and well- and ill-being in youth rugby players utilising a diary methodology. In studies incorporating cross-sectional research it is not possible to establish direction or causation regarding the relationships of interest. Therefore, it is important to explore the hypothesised interrelationships between perceptions of the social environment, BPNS, team cohesion, and well- and ill-being outcomes over time. Diary studies enable researchers to gain a better understanding of how the theoretically-grounded processes operate on a daily/short term more dynamic basis.

CHAPTER 2

GENERAL METHODS

Introduction

The sections outlined in this chapter provide detail behind the methods adopted for the empirical chapters three, four, and five. Any additional alterations to the methods that are not described in this chapter are detailed in the specific empirical chapters. Information on the participants, procedures and methods relating to the fourth study with the academy rugby players are summarised in chapter six. The studies comprising chapters Three, Four, and Five examined data from the recruitment of two hockey player samples; namely; elite and non-elite hockey player samples. The elite level players were identified by the fact that they were attending training sessions for their respective age group National squads. Non-elite players were considered to be participants who competed at school, county, and regional levels, but not at National level.

In the first empirical chapter (Chapter Three), data from both the elite and non-elite players were utilised to examine the positioning of team cohesion as both an antecedent and an outcome in the BNT framework. This chapter also investigated structural invariance of the hypothesised motivational sequence between elite and non-elite hockey players. In chapter four, the interplay between elite hockey players' reported perceptions of the coach-created environment, BPNS, and well- and ill-being *when referenced for the team as a whole* (i.e., team-referenced). For a more detailed explanation of the team-referenced approach and the adapted items used in this study specifically, please refer to chapter four. Finally, in chapter five, the elite and non-elite player samples were combined again and an approach was used that enabled the associations between the BNT-related variables to be analysed for individual players nested within teams (i.e., within-teams and between-teams).

Participants and procedures

Overall players had been participating in hockey within their respective teams and with the coach for 2.20 seasons ($M = 2.20$; $SD = 1.63$). Players trained and competed in hockey for a mean of 5.74 hours per week ($M = 5.74$; $SD = 3.75$) with elite players ($M=8.2$; $SD=3.3$) training for a greater number of hours than non-elite players ($M=2.8$; $SD=1.5$). On average the players spent 1.71 hours with their coach each week in training and competition ($M = 1.71$; $SD = 1.48$) and as expected elite players ($M= 2.6$; $SD=1.5$) spent more time than the non-elite players with their coach each week ($M=0.7$; $SD=0.4$).

Recruitment and ethical procedures

Ethical approval for the studies in chapters three, four, and five, was granted by the University of Birmingham Ethics Committee. Team managers and coaches of the participating hockey teams were contacted and received a letter explaining the purpose of the study, as did the parents of players under 16 years of age. Informed consent was subsequently received from the parents/guardians of participants under the age of 16 years (under 18 years in the case of the elite players) prior to the completion of the questionnaire. Written and verbal instructions on how to fill in the questionnaire were given to the athletes by a trained researcher or by a member of the hockey management team not involved in team selection, who had been fully briefed on the process. These instructions stated that responses would be kept confidential, that there were no right or wrong answers, and emphasized the importance of personal and honest responses to the questionnaire items. Convenient meeting dates and times were arranged with the team managers and coaches for each team of players.

Measures

Coach-Created Environment A seven-item measure of autonomy supportive coaching was adapted from the Health Climate Questionnaire (Williams, Grow, Freedman, Ryan, 1996; Reinboth & Duda, 2006) and employed to assess the degree to which players perceived that their coaches provided meaningful choice, reasons for tasks to be performed, whether they felt involved in decision-making, and considered their feelings (e.g., “My coach gives players choices and options”). Previous sport research has found athletes’ scores to be reliable and valid when responding to this scale (e.g., Adie et al, 2008).

The fifteen-item measure of coach controlling behaviours (Bartholomew et al, 2010) was employed to assess the players’ perceptions of the controlling features of the climate as created by the coach. This measure comprises four subscales tapping ‘Controlling Use of Rewards’ (e.g., “My coach only uses rewards/praise so that I complete all the tasks he/she sets during training”), ‘Negative Conditional Regard’ (e.g., “My coach is less friendly with me if I don’t make the effort to see things his/her way”), ‘Intimidation’ (e.g., “My coach intimidates me into doing the things that he/she wants me to do”), and ‘Excessive Personal Control’ (e.g., “My coach tries to control what I do during my free time”). Athletes’ responses to the subscales have demonstrated good content and factorial validity, and these subscales have been marked by high internal consistency and invariance across gender and sport type (Bartholomew et al, 2010). In the present work, we used a composite score for ‘controlling coaching’.

For both coach-created environment scales (i.e., autonomy support and controlling behaviours), and in the case of the non-elite hockey players, all items (e.g., “My coach is less friendly with me if I don’t make the effort to see things his/her way”) were preceded by the instructions “...so far this season...” Players were asked to reflect upon “...what do you think

it is like on your team most of the time?” and “...what kind of atmosphere does your main coach generally create?” The elite hockey players were instructed to reflect upon “... how it typically has felt to play on the team this season...,” and “... how your coach typically treated you ...” In addition, in chapter four, the elite players were also asked to reflect upon “...how your coach treated your teammates / team as a whole ...” Responses for all items in the coach-created environment scales were indicated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Perceived Team Cohesion The 18-item Youth Sport Environment Questionnaire (Eys, Loughhead, Bray & Carron, 2009a) was utilised to assess players’ evaluation of task and social cohesion within their teams. The measure was specifically designed to assess perceptions of cohesion in members of youth (13-17 years of age) sport groups. Following the stem “The following questions ask about your feelings toward your team,” players were asked indicate their responses on a nine-point Likert scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) indicative of their perceptions for the team. The measure contains eight task cohesion items, eight social cohesion items. Items included statements such as “We all share the same commitment to our team’s goals,” and “I like the way we work together as a team” which tapped into facets of task cohesion. Items capturing social cohesion included “I am going to keep in contact with my teammates after the season ends,” and “We hang out with one another whenever possible.” Athletes’ scores on the questionnaire have demonstrated good initial psychometric properties (e.g., factor structure and internal reliability of task and social dimensions) (Eys, Loughhead, Bray, & Carron, 2009b).

Perceived Autonomy Need Satisfaction Six items from Standage, Duda, and Ntoumanis’s (2005) study were utilised to assess players’ satisfaction of the need for autonomy (e.g., “I had a say regarding what skills I want to practice”), preceded by the stem “On this team,

during the last month...”. Responses were made on a seven-point Likert scale anchored by 1 (*strongly disagree*) to 7 (*strongly agree*). Support for the internal reliability and validity of British university athletes’ scores on a five-item version of this scale has been reported (Reinboth & Duda, 2006).

Perceived Competence Need Satisfaction The five-item perceived ability subscale of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989) was used to assess players’ satisfaction of the need for competence (e.g., “I was pretty skilled at hockey”). Items were measured on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*). Athletes’ (of a similar age to the current study) scores on the competence subscale of the IMI has demonstrated acceptable reliability and validity (Alvarez, Balaguer, Castillo, & Duda, 2009; Ntoumanis, 2001; Gagne et al, 2003; Reinboth & Duda, 2006).

Perceived Relatedness Need Satisfaction The need for relatedness was measured by five items from the Acceptance subscale of the Need for Relatedness Scale (Richer and Vallerand, 1998). Relatedness was examined with respect to the coach (Chapters Four and Five) and in regard to one’s teammates (Chapter Three). Both approaches have been employed in previous studies (Reinboth & Duda, 2006). In the case of the first study (chapter three), we focused on relatedness to teammates as it was felt that this perspective on relatedness was likely to be more highly and positively correlated with task and social cohesion (Reinboth & Duda, 2006). Responses were provided on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal reliability of athletes’ scores on scales tapping satisfaction of the need for relatedness to teammates has been supported in previous research (Reinboth & Duda, 2006).

Indicators of Athlete Well- and Ill-being Feelings of vitality/energy were measured by the six-item version of the Subjective Vitality Scale (Ryan & Frederick, 1997). Player responses

were indicated on a seven-point Likert scale anchored by 1 (*not at all true*) and 7 (*very true*). The stem “On this team, during the last month ...” preceded the items (e.g., “I felt alive and vital”). In previous sport research, athletes’ scores on this scale have been found to be valid and reliable (e.g., Gagne et al, 2003; Reinboth & Duda, 2006; Blanchard et al, 2009).

Players’ perceptions of the degree of emotional and physical exhaustion experienced in hockey were assessed using the five-item emotional and physical exhaustion subscale from the Athlete Burnout Questionnaire (Raedeke & Smith, 2001). On a scale of 1 (*almost never*) to 5 (*almost always*), the athletes responded to items such as “I was exhausted by the mental and physical demands of hockey,” with players being asked to reflect upon their feelings of physical and emotional exhaustion perceived over the last month. The stem “On this team, during the last month...” preceded the items. The validity and reliability of athletes’ scores on this scale has been supported in past sport research (e.g., Lonsdale, et al, 2009; Raedeke & Smith, 2001).

CHAPTER 3

TEAM COHESION, COACH BEHAVIOURS, PSYCHOLOGICAL NEED SATISFACTION, AND WELL-BEING AND ILL-BEING IN YOUTH HOCKEY PLAYERS

Abstract

Grounded in basic psychological needs theory (BNT; Deci & Ryan, 2002), the major purpose of this study was to determine the role of task and social cohesion in the motivational sequence proposed by BNT. Specifically, two competing models were tested; one with cohesion as a predictor, and a second with cohesion as an outcome. A second aim was to test invariance (across competitive level) in the relationships between the coach-provided autonomy support and controlling behaviours, basic psychological need satisfaction, cohesion and well- and ill-being in team sport athletes. Elite ($n = 249$; M age =17.20 years) and non-elite ($n = 214$; M age =14.86 years) hockey players completed a multi-section questionnaire assessing targeted variables. Structural equation modelling supported a better fit to the hypothesised model when task and social cohesion were positioned as outcomes within the BNT sequence, albeit an alternative model with task and social cohesion as antecedents also provided an adequate fit. Findings also are consistent with the assumed universality of BNT across elite and non-elite hockey samples.

It has been well established that engagement in sport and physical activity can be associated with positive psychological outcomes (Balaguer, et al, 2012) but also indicators of compromised health (Hodge, et al, 2008) in athletes. Within team sports, group dynamics and the social psychological environment created by the coach are considered important predictors of the quality of athletes' participation in sport and their experienced well-being (Riley & Smith, 2011; Ntoumanis, Taylor & Thøgersen-Ntoumani, 2012; Defreese & Smith, 2013). However, there is limited understanding of how key constructs embedded in the motivation and group dynamics literature may be combined to explicate psychological well- and ill-being in athletes. Therefore, the main purpose of the current project was to integrate an established characteristic of group functioning, namely team cohesion, within an established motivation framework (i.e., basic psychological needs theory; BNT; Ryan & Deci, 2000, 2002) to gain a better understanding of the processes that are associated with indicators of psychological well- and ill-being in hockey players.

BNT and Predictions Regarding Athletes' Functioning

BNT (Ryan & Deci, 2000, 2002), a mini-theory of self-determination theory (SDT; Deci & Ryan, 1985, 2000), provides a framework through which the social psychological determinants of optimal or compromised functioning can be explored (Hagger & Chatzisarantis, 2007). Within BNT, the degree to which people's basic psychological needs for autonomy, competence, and relatedness are satisfied or thwarted has implications for the extent to which their behaviours are more or less self-determined and the degree to which well-being and/or ill-being are experienced (Deci & Ryan, 2000). The satisfaction of the need for autonomy involves individuals feeling that they have meaningful choice and that they are able to act through their own volition rather than being controlled by external forces (De Charms, 1968). The satisfaction of the need for competence is demonstrated through an

individual's experience of being effective and feeling that they possess adequate ability (White, 1959). The satisfaction of the need for relatedness describes the experience when an individual feels a secure connection and understanding by others and they perceive a sense of "belongingness" (Baumeister & Leary, 1995).

Ryan and Deci (2000) suggest that when testing the role of basic psychological needs satisfaction (BPNS) or deprivation (BPNT) on optimal functioning, it is important to consider the extent to which both well- and ill-being are experienced. That is, examining levels of both well- and ill-being provides a better insight into an individual's overall psychological health and functioning. Higher levels of need satisfaction have been found to be associated with indicators of positive psychological well-being in both recreational (Reinboth & Duda, 2006; Reinboth, Duda, & Ntoumanis, 2004) and elite sports participants (Adie et al, 2008; Adie, Duda, & Ntoumanis, 2010). In addition, need satisfaction has been negatively correlated with indices of athletes' ill-being (Adie et al, 2008). The thwarting of the BPNs has been found to be predictive of negative outcomes in sport such as anxiety (Bartholomew et al, 2011), physical and emotional exhaustion (Balaguer et al, 2012), and drop out from sports participation (Quested et al, 2013).

Deci and Ryan (2000) proposed that well-being is best characterized from a eudaimonic perspective. Eudaimonic well-being is captured by the extent to which a person is fully functioning (Deci & Ryan, 2000) and is reflected in individuals who behave in a manner congruent to their authentic self (Sheldon & Elliot, 1999) and who pursue activities that are personally meaningful (McGregor & Little, 1998). Throughout BNT-based research, it is assumed that a key indicator of athlete eudaimonic well-being and optimal functioning is the level of subjective vitality (Reinboth & Duda, 2006). Subjective vitality is defined as 'a positive feeling of aliveness and energy' (Ryan & Frederick, 1997), and is assumed, as part of

SDT, to be predicted by athletes' reported BPNS. This is because when athletes feel that satisfaction of their basic psychological needs meet the levels required, as a result of this more adaptive way of functioning in alignment with their authentic self, individuals are likely to experience greater levels of energy and subjective vitality (Deci & Ryan, 2008). In support of this assumption, previous research has confirmed BPNS to positively predict subjective vitality in both recreational and elite sports team athletes (Gagne, et al, 2003; Reinboth & Duda, 2006; Adie et al, 2008). Whilst vitality has been identified as a key indicator of well-being, the degree of physical and emotional exhaustion experienced by athletes has been used to reflect levels of ill-being experienced in sport. Physical and emotional exhaustion (PEE; Raedeke & Smith, 2001) is considered a central indicator of athlete burnout (Gustafsson, Kentta, & Hassmen, 2011) and has consistently emerged as a correlate of low BPNS and/or psychological need thwarting (Lonsdale, et al, 2009; Balaguer et al, 2012). Across a number of studies unfulfilled BPNS has been negatively correlated with physical and emotional exhaustion when examined both independently and as part of burn out symptoms (Ekland & Cresswell, 2003; Raedeke & Smith, 2001; Lonsdale et al, 2009). Acknowledging the importance of measuring indicators of both well- and ill-being in athletes, we simultaneously examined subjective vitality and PEE to gain a more comprehensive insight into the functioning of sport participants' correlates of BPNS in team-based sport.

The Social Context and BPNS

According to BNT (Bartholomew et al, 2011) when applied to sport, the extent to which an athlete's basic psychological needs are satisfied or thwarted, and thus their experience of vitality or physical and emotional exhaustion, is determined by the degree to which the coach-created environment is autonomy supportive or controlling. Autonomy supportive coaching is expected to promote the satisfaction of athletes' need for autonomy as

athletes are more likely to feel that they are provided with choice and a clear rationale for tasks engaged in during training and competition. Coaches that demonstrate autonomy supportive behaviours also actively seek to understand and acknowledge athletes' feelings and therefore are more likely to satisfy the athletes' psychological need for relatedness. The need for competence may also be satisfied in an autonomy supportive climate through task-focused feedback on performance during training and competition (Mageau & Vallerand, 2003). In support of these hypotheses, coach autonomy support has been found to positively predict satisfaction of the three basic psychological needs in team sport athletes (Adie et al, 2010; Adie, Duda, & Ntoumanis, 2012; Balaguer et al, 2012).

In addition to autonomy support, SDT acknowledges the conditions that stifle the satisfaction of an individual's psychological needs. In sport, conditions that are associated with unfulfilled need satisfaction have typically been captured by the examination of controlling coaching behaviours (Balaguer et al, 2012). Autonomy supportive and controlling coach behaviours are not polar opposites and both features may be present within any coach-created environment (Balaguer et al, 2012; Ommundsen, et al, 2010). Therefore, the simultaneous assessment of the contribution of both autonomy supportive and controlling aspects of social environment allows a more comprehensive assessment of the coaching behaviours that satisfy or undermine athletes' basic psychological needs.

With respect to the concept of controlling coaching, Bartholomew and colleagues consider the extent to which coaches are characterized by controlling use of rewards, negative conditional regard, intimidation, and excessive personal control (Bartholomew, et al, 2010). Previous research in sport has shown that controlling coaching is associated with athletes' compromised need satisfaction in swimmers, track and field athletes, and dancers (Bartholomew, et al, 2011). Controlling coach-created environments are expected to

undermine athletes' basic need satisfaction and may actively thwart need satisfaction by preventing athletes from feeling involved during their participation in sport, by negatively impacting on athletes' perceptions of connectedness with teammates and their coach, and reducing athletes' sense of their ability within their specific sport environment (Bartholomew et al, 2011).

Team Cohesion and Basic Psychological Needs

In addition to autonomy support and controlling coach behaviours, social environmental factors such as task-involving and ego-involving climates (Reinboth & Duda, 2006; Adie et al, 2008) and peer related factors (Smith & D'Arripe-Longueville, 2014) have been found to influence the extent of BPNS in team sport athletes. In addition, it is likely that other social environmental factors will influence the extent to which psychological needs are satisfied/thwarted particularly within team sports. One such factor is team cohesion (Carron, et al, 1998; Heuze, Sarrazin, Masiero, Raimbault, & Thomas, 2006; Robinette, Charles, Mogle, & Almeida, 2013). Cohesion has been defined as a dynamic process "that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives" (Carron, 1982, p124). Cohesion is multidimensional including facets of both task and social cohesion. Task cohesion captures the degree to which members of a group work together to achieve common goals. Social cohesion represents the degree to which members of a team like each other and enjoy one another's company (Carron et al, 1998).

Studies have shown that cohesion is positively associated with BPNS that in turn has been related to better regulation of negative emotions, and reduced social exclusion (Taylor & Bruner, 2012). In their study involving basketball players, Blanchard and colleagues found that task cohesion positively predicted competence and autonomy but most strongly predicted

perceptions of relatedness, while coaches' controlling interpersonal style negatively predicted feelings of autonomy (Blanchard, et al, 2009). In turn, athletes' BPNS predicted subjective vitality and their satisfaction in basketball (Blanchard et al, 2009).

Although initial evidence for a link between cohesion and basic psychological need satisfaction was garnered, Blanchard et al's study failed to adopt a multi-dimensional conceptualization of cohesion that recognizes both task and social facets. In addition, in their study, Blanchard et al. considered cohesion as an antecedent in the process model. However, it could be argued that cohesion could also be positioned as an outcome of experienced need satisfaction. When athletes feel that their BPNs of relatedness, autonomy, and competence are satisfied, it is likely that they will act in more pro-social ways towards other members of the team thus resulting in greater levels of reported cohesion for the team as a whole. That is, when individuals feel that they belong to a group, they are likely to feel that their opinions are valued and their participation within the group is meaningful to them. The increased levels of personal competence that may result from these positive interactions with teammates is also likely to motivate individual members to contribute to tasks and social activities shared by the group. Recent work examining coach- and teammate-created motivational environments found that BPNS was directly and indirectly related to prosocial and antisocial behaviour in athletes, thus supporting the importance of autonomy support and BPNS as important correlates of prosocial behaviour (Hodge & Gucciardi, 2015). Finally, in regards to limitations, Blanchard et al's study focused on only one dimension of coaching behaviours (i.e., controlling coaching); the implications of autonomy-supportive coaching in addition to controlling coaching in regard to ratings of cohesion and athletes' reported BPNS were not considered.

Basic Needs Theory as a Universal Concept

It has been proposed that an individual's striving for psychological need satisfaction is an inherent requirement for optimal functioning and that this, and other central tenets of BNT, are considered to be universal (Deci & Ryan, 2000). Therefore, the role that basic need satisfaction plays in enabling optimal functioning and well-being to occur, is expected to hold across culture, gender, age group (Deci, et al, 2001), and across multiple domains (Milyavskaya & Koestner, 2011). In support of this assumption in physical activity settings, Taylor and Lonsdale (2010) supported the universality of BNT in physical education settings across the UK and China. Invariance has also been established across different types of sports (Reinboth, et al, 2004; Reinboth & Duda, 2006) and partial support was provided across different dance settings (i.e., classes, rehearsals, and performances; Quested, et al, 2013). Likewise, we would also expect that the tenets of BNT would hold regardless of the competitive level of individual athletes, i.e., relationships between the social environment, need satisfaction, and well- and ill-being would be invariant between elite and athletes identified as non-elite. However, to date, this assumption has not been tested.

The Present Study

Grounded in BNT (Deci & Ryan, 2002), and as an extension to the work by Blanchard et al (2009) in particular, the present research tested two theory-informed models to gain a deeper understanding of the pathways between the coach-created environment and BPNS to athlete well- and ill-being. Regarding model one, we considered task and social cohesion as antecedents of athletes' self-reported BPNS. While Blanchard et al (2009) found that task cohesion most strongly predicted players' feelings of relatedness (compared to autonomy and competence), it is likely that the paths between social cohesion and the need for relatedness to teammates would be stronger than for task cohesion, and it is expected that task cohesion

rather than social cohesion would be more predictive of satisfaction of the need for competence. In addition, we hypothesised that the extent to which athletes perceive the coach-created environment to be autonomy supportive would be the strongest predictor of BPNS as compared to controlling coaching and the cohesion dimensions. Finally, we predicted that BPNS would positively predict vitality and negatively predict exhaustion.

In model two, we hypothesised that coach-created environments perceived as higher in autonomy supportive features would positively predict, and controlling coaching negative predict, satisfaction of the basic psychological needs. In turn, BPNS would be associated with greater cohesion in the team environment and also with players' greater levels of reported subjective vitality and lower feelings of exhaustion. It makes conceptual sense that when athletes feel a heightened sense of relatedness, they would be likely to experience higher social cohesion with other members of their team. When players experience greater competence need satisfaction, this could also enhance task cohesion. In contrast, in social environments (i.e., more controlling social environments) where the psychological needs are not satisfied, athletes' reported levels of exhaustion are likely to be higher and levels of vitality and cohesion to be lower.

Regarding the secondary purpose, in this study we also expected the relationships between perceptions of the social environment, need satisfaction, well- and ill-being and team cohesion to be invariant between elite and non-elite hockey players (Ryan & Deci, 2000; 2002).

Method

Participants and Procedures

Four hundred and sixty-three (186 males, 277 females; M age = 16.03 years; SD = 1.76) junior field hockey players from elite level (N = 249; M age = 17.20 years; SD = 1.82) and

non-elite level ($N = 214$; M age = 14.86 years; $SD = 1.70$) teams were recruited from across the UK during their squad training sessions. The questionnaires for both elite and non-elite hockey players were completed during the most competitive phase of the hockey season: between March and April for the non-elite players and during June and July for the elite players.

A multi-section questionnaire was administered to both elite and non-elite players which explored their perceptions of dimensions of the social environment prevailing in training and competitive events, level of task and social cohesion, psychological need satisfaction, and indices of well- and ill-being. On average, the questionnaire took approximately 30 minutes to complete.

Data Analysis

Structural equation modeling (SEM) was employed (using Version 19 of the AMOS software) (Arbuckle, 2007) to test relationships within the measurement model and hypothesized structural models following the recommendations of Kline (2010) and Byrne (2004; 2010). Prior to testing the hypothesised structural models, CFAs were carried out for each of the scales for elite and non-elite player samples. Initially these were tested separately for elite and non-elite players and then samples were combined and the CFAs rerun. A baseline measurement model was constructed representing a model that best fits the data based on parsimony and theoretical meaningfulness (Byrne, 2004). This initial baseline model was adjusted using justified parceling methods to improve the ratio of variables to sample size (Sterba & MacCallum, 2010). Measurement invariance between elite and non-elite player samples was established for all the variables within the measurement model following the approach outlined by Byrne (2004; 2010) where the factorial structure (i.e., factor loading regression paths, factor variances, and factor covariances) were tested across

the two groups.

Two hypothesised structural models were then constructed to assess whether the data provided an adequate fit to the hypothesised model. The first model was designed to assess task and social cohesion as antecedents in the BNT sequence (Model 1). In a second model, task and social cohesion were positioned as outcomes (Model 2). Initially these two models (i.e., Model 1 and Model 2) were tested separately (i.e., for elite and non-elite hockey samples) to establish whether there were any significant differences in the parameter estimates between the two distinct hockey player samples. A baseline model was constructed that represented the best fit to the data based on parsimony (Byrne, 2004). To evaluate model fit, the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) were chosen as indicators of absolute fit (Hu & Bentler, 1999). RMSEA values close to .06 and SRMR values close to .08 have been deemed to indicate a model with good fit to the data (Hu & Bentler, 1999). 90% confidence intervals were used to confirm confidence in the RMSEA values (Hu & Bentler, 1999). Lower confidence interval values near to .00 (or no less than .05) and upper values of less than .08 are considered acceptable (Cheung & Rensvold, 2002). The incremental fit indices were represented by the comparative fit index (CFI). CFI values above .90 have been used to indicate adequate model fit, however values equal to or greater than .95 are considered to be the cut off criterion for models with good fit (Hu & Bentler, 1999). We also tested for the better fitting structural model between the two models outlined (i.e., Model 1 or Model 2). To determine the better fitting model, we employed the Akaike Information Criterion (AIC) values for each constrained model (i.e., Model 1 and Model 2). The model with the lower AIC value is considered the model that represents the data most accurately.

Finally, once the structural model with the better fit had been established, we tested this

structural model to determine invariance of the paths (i.e., factor loadings, factors variances, factor covariances) between variables across elite and non-elite samples following the approach outlined by Byrne (2004; 2010). This approach involved holding the weight of all estimated regression paths equal across both elite and non-elite samples (i.e., the constrained model) and comparing CFI values with the initial unconstrained model that combined the testing of elite and non-elite samples simultaneously. Non-invariance is established between groups where differences in CFI values greater than .01 are found between the constrained and unconstrained structural models (Cheung & Rensvold, 2002). Following invariance testing for the overall structural model across elite and non-elite players, the invariance of the parameter estimates were tested sequentially (i.e., factor loadings, factor variances, and factor covariances) for each of the paths in the hypothesized structural model to determine whether there were any differences in the relationships between these individual paths across the competitive levels.

Results

Table 3.1 presents descriptive statistics, alpha reliability coefficients, and correlations for all of the measures employed in this study. Overall, players reported higher levels of autonomy supportive features of the coach-created environment and perceived levels of BPNS were above the mid-point with competence being the highest. Both dimensions of team cohesion (i.e., task and social cohesion) were above the mid-point with levels of task cohesion mean .45 higher than social cohesion. Feelings of subjective vitality were high and the reported levels of physical and emotional exhaustion were just above the median. These levels are typical of those found in previous studies with youth athletes and dancers (Adie et al, 2008; Quested et al, 2010). The alpha reliability coefficients for all measures were above .70 indicating good levels of reliability (Nunnally, 1978).

Table 3.1 Descriptive statistics, alpha coefficients, and correlations of the measures for hockey players

	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7	8	9
1. Controlling Climate	2.37	.51	.80	-								
2. Autonomy Supportive Climate	3.74	.57	.85	-.34**	-							
3. Competence	4.98	.95	.84	-.21**	.36**	-						
4. Autonomy	4.00	1.07	.70	-.06	.37**	.35**	-					
5. Relatedness to Teammates	4.00	.72	.92	-.16*	.25**	.28**	.20**	-				
6. Vitality	4.83	1.23	.93	-.15*	.46**	.55**	.38**	.38**	-			
7. Exhaustion	2.72	.91	.91	.28**	-.19**	-.22**	-.10*	-.06	-.39**	-		
8. Task Cohesion	6.90	.91	.91	-.19**	.36**	.37**	.24**	.61**	.46**	-.13**	-	
9. Social Cohesion	6.45	.94	.94	-.09	.23**	.23**	.27**	.52**	.29**	-.02	.62**	-

¹ Note. Measures for *Autonomy*, *Competence*, and *Vitality* used a 7-point Likert scale. *Task* and *Social Cohesion* used a 9-point Likert scale. All other measures used a 5-point Likert scale.

- $p < .01$, ** $p < .001$

Table 3.2 Results of confirmatory factor analysis for individual scales across combined samples of elite and non-elite hockey players

	<i>X</i> ²	<i>df</i>	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>
Controlling Climate	18.22	4	.98	.08 (.078-.081)	.02
Autonomy Supportive Climate	14.86	8	.97	.06 (.057-.064)	.04
Competence	5.61	2	.99	.04 (.037-.045)	.02
Autonomy	3.49	1	.98	.07 (.065-.074)	.04
Relatedness to Teammates	10.99	5	.99	.05 (.045-.053)	.02
Vitality	21.98	4	.93	.08 (.076-.084)	.04
Exhaustion	11.09	3	.96	.12 (.118-.122)	.04
Task Cohesion	27.73	4	.98	.07 (.065-.074)	.04
Social Cohesion	14.35	4	.98	.08 (.078-.081)	.01

Testing the Measurement Model

Results of the confirmatory factor analysis for each of the measurement scales for the combined sample (i.e., across elite and non-elite hockey player samples) are detailed in Table 3.2. Overall the goodness-of-fit indices revealed reflected acceptable values apart from the RMSEA for physical and emotional exhaustion that was higher than the recommended cut off criterion. Next a measurement model was constructed incorporating the measurement scales for all the variables of interest. Following the initial testing of the separate scales within the measurement model, the process of parceling was employed with some of the scales marked by a greater number of items (i.e., task and social cohesion and controlling cohesion) in an attempt to improve the ratio of variable to sample size (7.1 variables per participant). A parceling method for the task and social cohesion scales was used where consecutive items with the highest factor loading with items with the lowest factor loading were combined, as described by Little and colleagues (Little, Cunningham, Shahar, & Widaman, 2002)¹. The potential pitfalls of adopting parceling methods to improve model fit have been well

¹ Calculation of parcel-allocation variability indicated that there were no significant differences in the variability between the various item-solutions and parcel-solutions for this sample of hockey players providing greater confidence in the parsimony of the measurement model and hypothesized structural models (Sterba, 2011; Sterba & MacCallum, 2010).

documented (Sterba & MacCallum, 2010). Parcelling has been recommended for limited application only in those situations where sample size is low, there are low item commonalities, and items are unidimensional and congeneric (Sterba & MacCallum, 2010). Given the multidimensional nature of the controlling coaching scale, four parcels were created with each parcel representing the aggregate of the items for each specific subscale. The measurement model was then tested separately for elite [$X^2 = 1181.8$ (609); CFI = .91; RMSEA = .066 (95% CI = .061 - .071); SRMR = .08] and non-elite [$X^2 = 1092.6$ (574); CFI = .90; RMSEA = .066 (95% CI = .061 - .071); SRMR = .07] hockey player samples. Following separate tests of the measurement model across elite and non-elite samples, the fit of the measurement model incorporating both samples simultaneously was tested [$X^2 = 3009.37$ (1566); CFI = .90; RMSEA = .045 (95% CI = .042 - .052); SRMR = .08] indicating a model with acceptable fit.

The next step was to test the invariance of this combined measurement model across both groups using the recommended steps (Byrne, 2004; 2010) outlined above. The initial step involved holding all factor loadings (including factor variances and factor covariances) equal across both elite and non-elite samples (i.e., the constrained model) and comparing with the initial unconstrained model that combined the testing of elite and non-elite samples simultaneously. A comparison between the CFI values for the combined model [$X^2 = 3009.37$ (1566); CFI = .899; RMSEA = .045 (95% CI = .042 - .052); SRMR = .08] and fully constrained model [$X^2 = 3105.74$ (1599); CFI = .891; RMSEA = .045 (95% CI = .042 - .052); SRMR = .08] revealed invariance between elite and non-elite hockey player samples for the measurement model (Δ CFI = .008).

Testing Two Hypothesised Structural Models

Two hypothesised structural models were derived from the tenets underpinning BNT

(Deci & Ryan, 2000). The combined baseline Model 1 (cohesion as predictor of needs; see Figure 3.2) provided adequate fit to the data [$\chi^2 = 2629.27$ (1334); CFI= .90; RMSEA= .045 (95% CI = .043 - .053); SRMR = .08]. Combined baseline Model 2 (cohesion as outcome of needs; see Figure 3.1) also provided adequate fit to the data [$\chi^2 = 2681.63$ (1350); CFI= .91; RMSEA= .045 (95% CI = .043 - .053); SRMR = .08]. The comparison in AIC values between constrained Model 1 and Model 2 revealed the latter to have a lower AIC value, indicating that Model 2 was a better representation of the data relative to Model 1 (see Table 3.3). The structural model and path coefficients for Model 1 and Model 2 are presented in Figures 3.1 and 3.2, respectively. The associations between an autonomy supportive coach-created environment and athletes' BPNs were significant and positive as expected. The paths between controlling features of the coach-created environment and the BPNs were in a negative direction as hypothesised but non-significant.

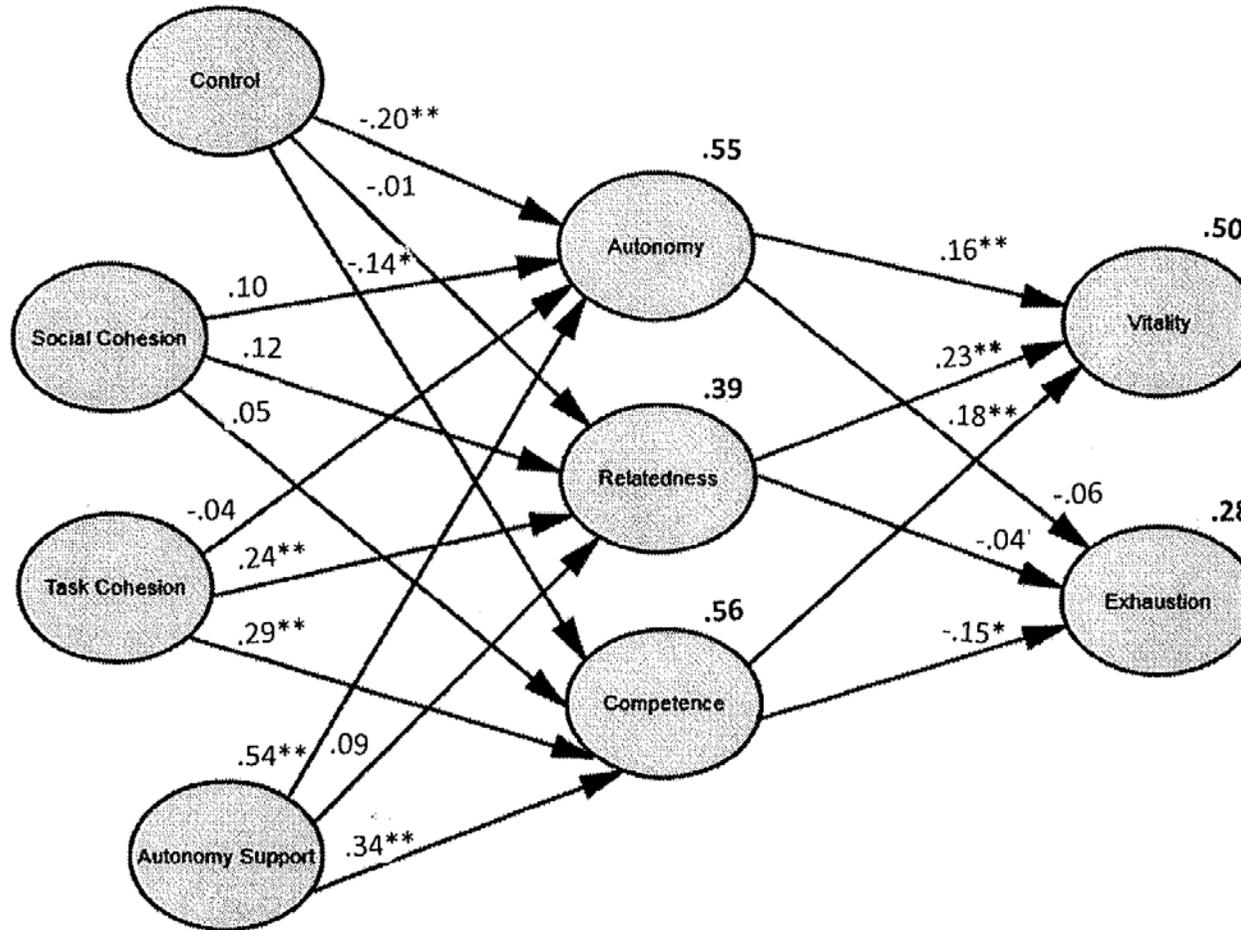
Table 3.3 Comparisons of goodness-of-fit indexes indicating structural invariance for models

Hypothesized Structural Model	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>	<i>AIC</i>
Model 1				
<i>Unconstrained</i>	.90	.05	.08	3257.63
<i>Constrained</i>	.90	.05	.08	3269.91
Model 2				
<i>Unconstrained</i>	.90	.05	.09	3237.23
<i>Constrained</i>	.89	.05	.08	3136.93

The path coefficients between both the need for relatedness and the need for autonomy with social cohesion were significant and in a positive direction across both Model 1 and Model 2. However, the path between the need for competence and social cohesion was non-significant across both models. Interestingly the strength of the relationship between social cohesion and relatedness was much higher in Model 2 ($\beta = .12$ in Model 1 and $\beta = .41$ in Model 2 respectively). The path coefficients between both competence and relatedness with task cohesion were significant and positive across Model 1 and Model 2 albeit the strength of

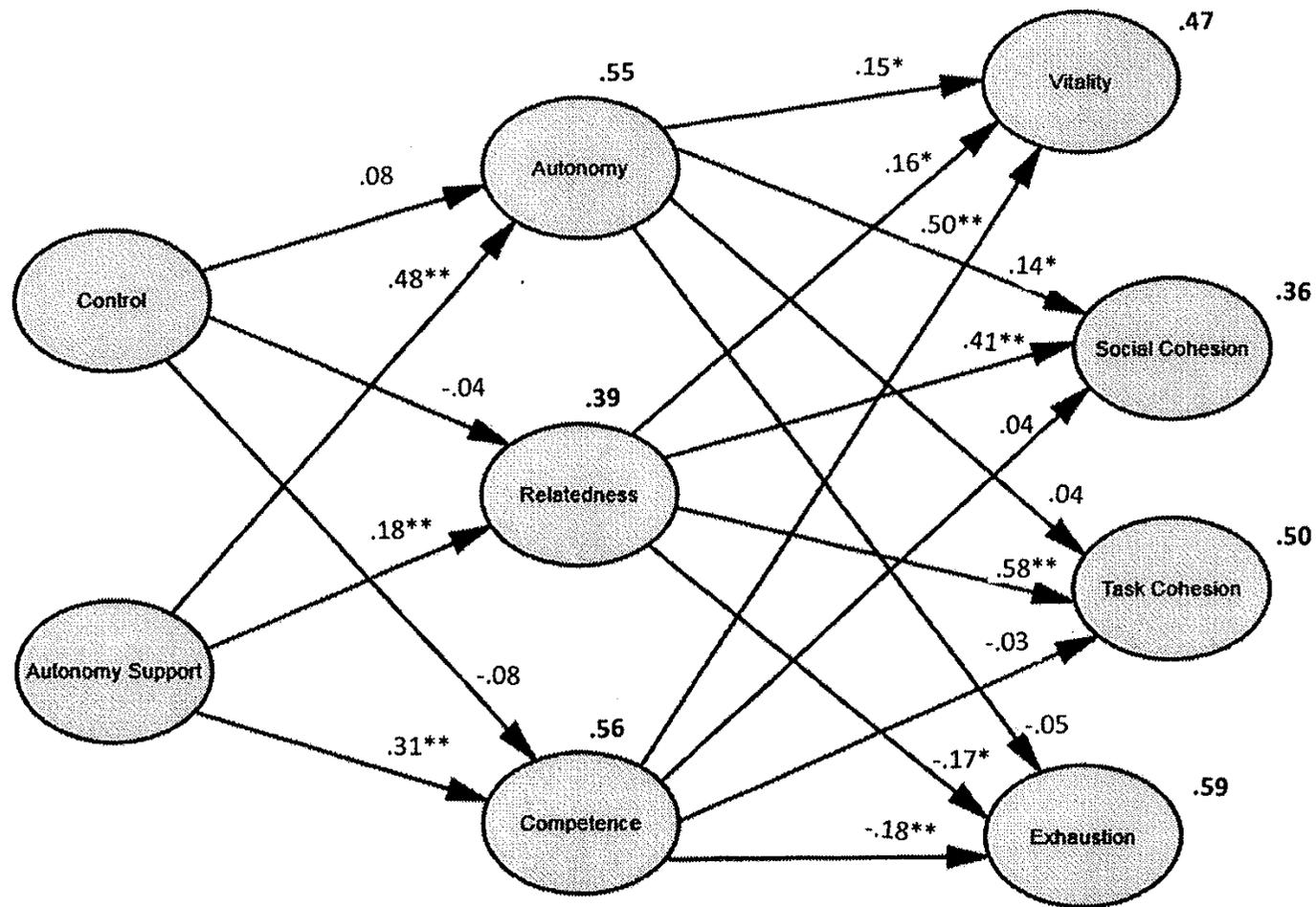
the relationship between relatedness and task cohesion was much greater in Model 2 ($\beta = .24$ in Model 1 and $\beta = .58$ in Model 2 respectively). Paths between autonomy and task cohesion were non-significant across both models. Satisfaction of each of the BPNs was positively related to subjective vitality, however only the need for competence was significantly associated with physical and emotional exhaustion and in a negative direction. The R^2 values in Model 2 indicate that the model fit explains 50% of the total variance of task cohesion scores and 36% for social cohesion, respectively. In the case for vitality and physical and emotional exhaustion, R^2 values were 47% and 59% for Model 2, and 50% (vitality) and 28% (physical and emotional exhaustion) in Model 1. Despite the models being very similar in their reported R^2 values, overall the higher reported percentages for Model 2

Figure 3.1. Model 1: Associations between the coaching climate and cohesion as an antecedent, BPNS, and well-being/ill-being.



N.B All coefficients presented are standardized and significant (*p < .05; **p < .01)

Figure 3.2. Model 2: Associations between the coaching climate, BPNS, and well-being/ill-being, cohesion.



N.B. All coefficients presented are standardized and significant (*p < .05; **p < .01) 57

indicate that the model fit explains a greater proportion of the variation in predicting BPNS and outcome variables.

Testing Invariance in the Hypothesised Structural Model

Despite the goodness-of-fit indices being very similar for Model 1 and Model 2, it was established that Model 2, with a lower AIC value, was a slightly more parsimonious model relative to Model 1. A test of structural invariance was conducted for Model 2 by comparing the CFI values for the combined model [$X^2 = 2681.63$ (1350); CFI= .899; RMSEA= .045 (95% CI = .043 - .053); SRMR = .08] and fully constrained model [$X^2 = 2776.93$ (1380); CFI= .894; RMSEA= .047 (95% CI = .044 - .052); SRMR = .09]. This test indicated structural invariance between elite and non-elite hockey player samples (Δ CFI = .005). Analyses testing invariance of parameter estimates (i.e., factor loadings, variances, and covariances) of the individual paths between elite and non-elite samples revealed the path between autonomy and vitality to be significantly stronger (i.e. elite players $\beta = .13$; non-elite players $\beta = .48$) in the non-elite hockey players.

Discussion

The major purpose of this study was to determine the relationships between hockey players' perceptions of the coach-created environment (both controlling and autonomy-supportive features), BPNS, reported indicators of well-being (i.e., subjective vitality) and ill-being (i.e., emotional and physical exhaustion), and to examine whether task and social cohesion are better placed as antecedents or outcomes in this sequence. A second aim was to test for invariance in the hypothesised relationships between elite and non-elite hockey players, as assumed in BNT. Overall, our findings support the roles of task and social cohesion as both possible antecedents and outcomes within the BNT framework. However, following the assessment of both structural models, positioning task and social cohesion as

outcomes within the sequence provided a model with better fit relative to the model in which task and social cohesion served as antecedents. These hypothesised relationships were also invariant between elite and non-elite hockey players. The findings from this study provide support for how BPNs can be influential beyond athletes' psychological health, as they also have important implications for the interpersonal relationships and team cohesion in elite and non-elite sport settings.

Testing BNT With Social and Task Cohesion as Antecedents and Outcomes

The evidence from this cross-sectional study indicates that Model 2, where task and social cohesion were positioned as outcomes in the BNT sequence, was the better fitting model relative to when task and social cohesion were assumed to be antecedents to these processes. However, it should be noted that the fit of both structural models was satisfactory and similar goodness-of-fit indices emerged. Therefore, the initial evidence from this study indicates that perceptions of task and social cohesion may be well positioned as both antecedents (i.e., features of the social environment) and as outcome variables in the process model. The present results extend findings from Blanchard et al (2009) who examined only task cohesion as an antecedent within the BNT sequence, and suggest that hockey players' experience of BPNS within the team environment may also be predicted by, and indeed be predictive of, how much team members like each other and interact accordingly (Brawley, et al, 1988).

With regards to specific pathways and as hypothesised, Models 1 and 2 revealed positive associations between autonomy and relatedness with social cohesion. As indicated above, social cohesion reflects the degree to which members of a team enjoy one another's company. When the need for relatedness is satisfied, members of a team are more likely to feel that they are valued and respected by their teammates and thus it makes sense they are

more likely to get along socially. Moreover, when players feel that they are able to voice their opinion and have input in a team setting (as reflected in satisfaction for the need for autonomy), it is also likely that hockey players' social interactions will be more cohesive. In such a case, one is more likely to feel that they are listened to and belong. Similarly, when players are enjoying each other's company within and outside of training and competitions, players are more likely to feel that they are a valued member of the team and will also feel comfortable to contribute their thoughts and opinions to the group. In contrast, the pathways between competence and social cohesion in Models 1 and 2 were non-significant.

The psychological needs for competence and relatedness to teammates were positively associated with task cohesion in both models. As Model 2 illustrates, when hockey players feel valued and listened to by their teammates then the association with task cohesion is likely to be high as the hockey players are working together and communicating more clearly towards a common goal or activity. Similarly, when hockey players feel that they are working well as a unit towards the tasks in hand, then their feelings of relatedness towards each other will be greater, as illustrated in Model 1.

Overall, in terms of the interplay between satisfaction of the need for competence and cohesion, our findings indicate that perceived social cohesion may be less important in terms of developing feelings of competence. In more competitive settings, it is possible that task cohesion is the more influential dimension of cohesion particularly with regards to players' perceptions of competence. Coaching environments that support the development of feelings of competence in players will more likely lead to players feeling confident enough in their own ability as players to be able to work cooperatively with their teammates to achieve a common goal. Alternatively, players who feel connected to their teammates through working together toward a common goal or activity, will be likely to develop greater feelings of

competence in their ability as hockey players. These findings support research linking team cohesion and collective efficacy as reciprocal constructs (Heuze, Bosselut, & Thomas, 2007). Similar to the present study, Heuze and colleagues found that the links between handball players' perceptions of collective efficacy to dimensions of task cohesion to be the strongest and suggested that the development of cohesion may largely be a consequence of what is most salient for the team members at a particular time or stage in the season (Heuze et al, 2007; Carron, 1982). The present data collection for the hockey players took place early in the competitive season and during the selection phase. During this period it may be most important for players to feel competent in their ability as hockey players and this will be linked to their desire to remain within the group or squad. Later on in the season, it is possible that the level of task cohesion may take on a more prominent role and the reciprocal relationships may switch towards task cohesion being more predictive of individual perceived competence (and also for team efficacy if also assessed). Finally, the pathways between the need for autonomy and task cohesion were not significant and these observed non-significant relationships were consistent across both hypothesised structural models. It is possible that the provision of personal choice and enabling hockey players to act of their own volition may be less relevant for working towards group tasks.

In sum, while AIC values indicated that Model 2 was the better fitting model structural model, there was little difference in the fit indices between the two hypothesized models. Therefore, the evidence from the current study suggests that the satisfaction of competence, autonomy and/or relatedness may predict, and be predicted by, task and/or social cohesion. Thus, it seems reasonable to suggest that the relationship between cohesion and BPNS is reciprocal, albeit future longitudinal studies that adopt a two-wave (e.g., Lonsdale & Hodge, 2011) or ideally a three-wave cross-lag panel design (e.g., Curran, Hill, Ntoumanis, Hall, &

Jowett, 2016) are needed to test these assumptions. Such work would help build upon the evidence from this cross-sectional study and determine whether cohesion is best conceptualised as an antecedent or outcome in the BPNT process model.

The Coach-Created Environment and BPNS

In Model 2, results also revealed significant and positive relationships between perceptions of an autonomy supportive coach-created environment and the three basic needs, which is consistent with previous research findings (Ommundsen et al, 2010; Quedsted et al, 2013b). Conversely, in this model, there were no significant relationships between the hockey players' perceptions of a controlling coach-created environment and the three basic needs. In similar studies that have explored both controlling and autonomy supportive coach-created environments simultaneously, controlling environments have not significantly linked to BPNS when autonomy supportive features of the environment are also considered (Balaguer et al, 2012). Moreover, recent studies examining controlling features of the coach-created environment found a stronger association with psychological need thwarting than was the case for need satisfaction (Balaguer et al, 2012). When the coach-created climate is perceived as being proportionately higher in autonomy supportive features compared to characteristics of controlling coach behaviours, as we found in our sample of hockey players, then the overall perceived coach-created environment may be considered more empowering (Duda, 2013). In more empowering environments, perceptions of a more autonomy supportive coaching style may minimise or perhaps buffer the negative influence of any controlling behaviours demonstrated by the coach on the satisfaction of athletes' feelings of competence, autonomy, and relatedness (Appleton & Duda, 2016). As suggested in previous work (Bartholomew et al, 2011; Balaguer et al, 2012), future research should also consider how controlling coaching is related to task and social cohesion and examine how these two

dimensions of cohesion correspond to whether athletes' BPNs are thwarted or compromised.

BPNS and Perceived Well-Being and Ill-Being Outcomes

As hypothesised, relationships between the satisfaction of the basic needs and subjective vitality were significant and positive. With regards to emotional and physical exhaustion, only the paths between competence and relatedness, with emotional and physical exhaustion were significant and in a negative direction. This indicates that the three psychological needs (i.e., autonomy, competence, relatedness) may be important in promoting athletes' psychological health and optimal functioning, but the satisfaction of the needs for competence and relatedness may be particularly important (compared to autonomy) with regards to preventing players' experience of ill-being. Our findings support previous sport and dance-related research (Balaguer et al, 2012; Quested et al, 2013) highlighting the relevance of perceptions of competence to experienced well-being and ill-being amongst participants in performance focused activities. It is possible that the thwarting of the need for autonomy, rather than low need satisfaction, might be more strongly associated with players' experience of exhaustion as has been indicated in previous studies (Balaguer et al, 2012). The need to feel competent about one's athletic abilities, or self-confidence, has consistently and positively been linked to feelings of well-being and performance in the sport psychology literature (Machida, et al, 2012). Feeling both competent, autonomous, and possessing a sense of relatedness not only serve to support positive well-being and adaptive functioning, but such perceptions of competence and social connection may also act as a buffer against a range of maladaptive behavioural outcomes thus reducing the likelihood of emotional exhaustion and burnout (Lonsdale et al, 2009; Appleton & Duda, 2016).

Testing Invariance Between Elite and Non-Elite Player Samples

Tests of invariance for the more parsimonious structural model (Model 2) revealed that the majority of relationships between variables within the BNT sequence were operating equivalently across elite and non-elite hockey players. However, the path between autonomy and vitality was found to be positive in both groups but significantly stronger in the non-elite hockey players. This finding suggests that having a say in training and feeling involved may be more important in determining athletes' well-being particularly for the non-elite hockey players in this study. However, it is possible that the comparatively weaker relationship between autonomy and vitality in the present elite group of hockey players may be due to the timing of the data collection. Data were collected during a selection phase of the season with many players being very new to the squads. Later in the season when final elite squads have been established and individuals are aware of their place within squads, it is possible that autonomy (having input, choice, acting out of one's volition) would play a more influential role in predicting feelings of vitality.

In general though, the findings from this study support the assumption (Deci & Ryan, 2000) that the tenets of BNT are consistent across sport competitive level. Moreover, present results are consonant with the growing body of literature that has provided evidence for the universality claim that the associations between BPNS and well-being are necessary for personal growth and optimal functioning across athletic samples (Ntoumanis et al, 2012). That is, the potential influence of coach behaviours on BPNS and, in turn, individual and team optimal functioning (including well-being, ill-being and cohesion, respectively) is an important consideration for all coaches of youth athletes in team sports settings to be cognizant of, regardless of the competitive standard. The present findings point to the need for theoretically grounded coach education interventions, which help coaches to create more autonomy supportive environments and to engage less in controlling behaviour when working

with recreational through elite youth sport participants.

Limitations and Future Directions

The present work makes an important contribution as the first study to simultaneously test the position of (both) cohesion dimensions in the BNT process model, and also test for invariance in the hypothesized models across competitive levels. However, a limitation of the present research is that a cross-sectional design was adopted. Thus, it is not possible to establish direction or certainly causation regarding the relationships examined. In regard to the former, future research should look towards extending the findings via the adoption of a longitudinal design. Longitudinal research will also help to explicate the best positioning of task and social cohesion in the BNT process model (Papiaoannou et al, 2004).

Whilst the findings provide insight into the question of whether the cohesion dimensions are antecedents and/or consequences of basic psychological needs, it should be noted that the data for this study were collected from only hockey players. It is possible that cohesion may be a better predictor, or be better predicted by, the psychological needs in other samples of athletes or in other team sports. The levels of interdependency (Johnson & Johnson, 2005), or the extent to which experiences are shared within such settings, are likely to vary according to the levels of interdependence required within different team sports. For example, hockey is a sport involving a high degree of interactive game play that requires a lot of verbal and physical communication between players in order to be performed successfully. In such settings, the extent to which members of a team or squad feel cohesive may have a greater impact on individual well-being and functioning compared to team sports where players are not as reliant on one another (e.g., cricket). In addition, in more interdependent sports there may be greater levels of “sharedness” in players’ feelings of competence,

autonomy, and relatedness and these collective feelings may also have a greater impact on the development of task cohesion within the team. Although findings from the present study provide support for the relevance of task and social cohesion within the BNT framework, another limitation of this study is that data were analysed only at the individual level. Future research could build on the present results and adopt a multi-level analytical approach with the analysis of teams considered at a second level (i.e., a group level of analysis).

Conclusions

Findings from the present study point to the roles of task cohesion and social cohesion as both predictors and outcomes within the BNT framework suggesting a potential reciprocal relationship with BPNS. Albeit, with this sample of hockey players, cohesion was found to be the better positioned as an outcome of BPNS. Furthermore, tests of invariance reveal that the tenets of BNT hold across competitive levels (i.e., elite and non-elite hockey playing samples) thus supporting the universality hypothesis proposed by Deci and Ryan (2000).

CHAPTER 4

PERCEIVED COACHING ENVIRONMENT, NEED SATISFACTION, AND WELL-BEING IN ELITE HOCKEY PLAYERS: ATHLETES' PERSPECTIVES OF THE VIEWS HELD BY THEIR TEAM.

Abstract

Research testing the tenets of Basic Needs Theory (BNT; Deci & Ryan, 2002) has focused on individuals' perspectives of the social environment, perceived need satisfaction in regard to their own experiences and indicators of their psychological and emotional welfare. To date, we have not considered the interplay between the relevant motivational processes and indices of optimal and diminished functioning as referenced to the group, when individuals are members of a team. Based on BNT, this study aimed to i) explore the interplay between individual athletes' perceptions of controlling and autonomy supportive features of the coach-created climate operating on their team, basic psychological need satisfaction (BPNS) experienced by the team as a whole, and indicators of team well-being and ill-being, and ii) test the role of team-referenced BPNS in mediating the relationship between dimensions of the coach-created climate and reported team well- and ill-being (i.e., subjective vitality and physical and emotional exhaustion, respectively). 246 (M age =17.22 years) elite junior field hockey players completed a multi-section questionnaire assessing the targeted variables. Findings provided support for the tenets of Basic Needs Theory when the central constructs are referenced to the team rather than individual. Results also point to the importance of particular needs in promoting optimal functioning in sport teams.

Within the sport domain, it is widely acknowledged that teams with the most talented individuals do not always outperform their less gifted rivals. Researchers have looked to aspects of group dynamics and team functioning, such as team cohesion (Carron et al, 2002), and collective efficacy (Feltz & Lirgg, 1998), in an attempt to explicate between-team variability in performance outcomes. Drawing from this literature, team-building interventions (e.g., Eys, Patterson, Loughhead, & Carron, 2006; Senecal, Loughhead, & Bloom, 2008; Pain & Harwood, 2009) have been implemented and evaluated in regard to their impact on team performance.

Beyond performance implications, there is evidence to support the potential social and mental health benefits for individuals who are members of groups and the factors which contribute to such benefits (Dackert, 2010; Wann, Waddill, Polk & Weaver, 2011). The experience of collective well-being within a team may be important for ensuring a team's optimized and sustained engagement in sport which in turn may also influence performance levels (Duda & Balaguer, 2007). Thus, it is important to assess and examine social environmental and motivational processes that may be relevant to optimal functioning and health in teams.

Basic Needs Theory (BNT; Ryan & Deci, 2000, 2002), a mini-theory within Self-determination Theory (SDT; Deci & Ryan, 1985, 2000), provides a framework through which the social psychological determinants of optimal or compromised functioning can be explored. BNT holds that satisfaction of people's basic psychological needs for autonomy, competence, and relatedness contributes to the extent to which well-being is experienced. BNT assumes that optimal functioning and well-being are promoted in environments which support basic psychological need satisfaction (BPNS), and manifestations of ill-being are expected to result from conditions that diminish or perhaps even thwart basic need

satisfaction (Deci & Ryan, 2000; Bartholomew, Ntoumanis, et al, 2011). Moreover, it is predicted that BPNS mediates the relationship between the social environment and manifestations of the quality of individuals' functioning. The tenets of BNT have been supported in sport settings where satisfaction of athletes' basic needs has had positive associations with indicators of athlete's personal well-being such as subjective vitality (Reinboth, et al, 2004; Reinboth & Duda, 2006; Adie et al, 2008), as well as sport enjoyment (Alvarez et al, 2009). In the case of athletes and other performers within the physical domain (such as dancers), low need satisfaction has been linked to indices of ill-being; e.g., physical and emotional exhaustion (Gagne et al, 2003), negative affect (Quested & Duda, 2010), and burnout (Lonsdale et al, 2009; Quested & Duda, 2011). Daily fluctuations in affective states across different situations and between different genres of dance have been demonstrated in vocational dancers (Quested et al, 2013).

BNT also maintains that the satisfaction of the basic needs, as a requirement for personal growth and optimal functioning, would hold across different demographic parameters and social/cultural contexts (Deci & Ryan, 2000; Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis, 2010; Deci et al, 2001; Taylor & Lonsdale, 2010). In the case of sport research testing BNT, the focus has been on the need satisfaction experience of *individuals* in relation to indicators of *individuals'* welfare. To our knowledge, there has been no research that has assessed the relevant motivational processes and outcomes assumed in BNT when the targeted variables are referenced to individuals' perceptions of the views and feelings of the group (or teams as a whole) to which they belong. If the basic needs are universal and essential to human striving across all circumstances and in all conditions, it is reasonable to expect that the relationships between dimensions of the environment, basic needs satisfaction, and well-being/ill-being outcomes which have been supported when

captured in reference to the individual's views, would also be evident when these individuals are operating in groups and thinking about how their group/team is feeling and functioning.

Shaw (1981) defined a group as '...two or more persons who are interacting with one another in such a manner that each person influences and is influenced by another person (p8). According to Carron, Hausenblas, and Eys (2005), a 'team' exists when individuals '...share a common fate, exhibit structured patterns of interaction and communication, hold common perceptions of group structure, are personally and instrumentally interdependent, reciprocate interpersonal attraction, and consider themselves to be a group.' It is possible that these distinguishing characteristics of a group may also be extended to shared feelings of need satisfaction and well-being and ill-being (Karreman et al, 2009).

In the case of extending the testing of basic needs theory (Deci & Ryan, 2000) to individuals' perspectives of what the team is experiencing, this necessitates operationalizing team "health," and basic need satisfaction for the team as a whole. In the present study, we adopted a similar approach to one that has been employed in past work on collective efficacy (Feltz & Lirgg, 1998), and cohesion in sport (Carron et al, 1995). This approach involved assessing individual player perceptions of their team's overall feelings of efficacy or state of cohesion. These individual player perceptions are aggregated to provide an overall assessment assumed to reflect team cohesion or collective efficacy.

In Deci and Ryan's (2000) conceptualization of basic psychological needs, the satisfaction of the need for autonomy involves the experience of choice, volition, and the feeling that one has control over his/her own actions. Feelings of autonomy also reflect the need for one's actions to be in accordance with personal values as opposed to being controlled by external forces or internal pressures (De Charms, 1968). Within a team sport setting, the

experience of autonomy may involve players collectively being given ownership over the organization and direction of their training sessions as opposed to being dictated their coach. Individual players' views regarding team-experienced autonomy would also be reflected when they feel the teams act volitionally, in accordance with the shared team values and beliefs.

In this study and exemplifying a 'referent-shift approach' (Chan, 1998), individual group members were asked to reflect upon their perceptions of whether they thought their team felt they had autonomy within their sport engagement. This 'team-referent' approach has also been employed in previous sports research in which individual volleyball players were asked to reflect upon team-referred causal attributions for overall team performance (Dithurbide, Sullivan, & Chow, 2009; Greenlees, Lane, Thelwell, Holder, & Hobson, 2005).

The satisfaction of the need for competence is realised when an individual experiences his or her behavior as effective and feels that he/she possesses adequate ability to meet the demands at hand (White, 1959). When defined in reference to a team, perceptions of competence could be described as players within a team having a shared feeling of effectiveness to bring about desired performance outcomes during training and competition. Much of the research investigating group or team-referenced competence across the organisational, educational, and sport domains has focused on the assessment of collective efficacy (Goddard, 2002; Magyar et al, 2004); i.e., "a group's shared belief of the group's capabilities to succeed at a given task" (Bandura, 1986). Past research on collective efficacy suggests that: (a) groups need to feel competent within team-based endeavors to perform optimally and (b) perceptions of collective competence hold implications for the group's welfare (Price & Weiss, 2013).

Finally, satisfaction of the need for relatedness is realized when one is securely connected to and understood by others and has a sense of “belongingness” (Baumeister & Leary, 1995). In terms of assessing the need for relatedness in BNT-based studies in sport, measures have been referenced to both an individual athlete’s reported relatedness to his/her coach and also relatedness to teammates (Reinboth & Duda, 2006). The concept of team cohesion has been conceptualised as the integration of aspects of both task and social cohesion (Carron et al, 2002) with perceived team relatedness being more aligned with the latter construct. As indicated in studies examining social cohesion (Carron et al, 2002; Blanchard et al, 2009), individual player perceptions of the extent to which the team as a whole feels valued, supported, and cared for by the coach is likely to be an important determinant of overall team functioning.

Well-being and Optimal Functioning in Teams

Considered a key marker of eudaimonic well-being, subjective vitality (i.e., ‘a positive feeling of aliveness and energy’) has been associated with self-actualisation, self-determination, mental health, and self-esteem (Ryan & Frederick, 1997). In previous sport studies, athletes’ reported basic needs satisfaction positively predicted their feelings of personal energy or vitality (Gagne et al, 2003; Reinboth & Duda, 2006; Adie et al, 2008). In the present study, we examined whether team-referenced competence, autonomy, and relatedness predicted individual team members’ perceptions of the feelings of energy and vitality manifested within their team.

In research grounded in BNT, a number of variables have been employed to operationalise ill-being and/or maladaptive functioning among athletes. One typical indicator of ill-being is burnout. Basic need satisfaction has emerged as a negative predictor of athlete

burnout in elite adult athletes (Hodge et al, 2008; Lonsdale et al, 2009), vocational dancers (Quested & Duda, 2010), and young footballers (Balaguer, Gonzalez, Fabra, Castillo, Merce & Duda, 2012). The physical and emotional exhaustion subscale of the Raedeke and Smith (2001) Athlete Burnout Questionnaire (ABQ) is considered to reflect a central dimension of global burnout (e.g., Lonsdale et al, 2009; Quested & Duda, 2010). Previous research has centred on this reported burnout symptom in the case of the individual athlete/performer. Within the present work, we were interested in examining the relationship of need satisfaction to individual athletes' views of the degree of physical and emotional exhaustion manifested within the team as a whole.

The Social Context and Needs Satisfaction

SDT-grounded sport research tends to examine autonomy support as an important characteristic of the social environment. Perceptions of autonomy support are considered critical to the level of need satisfaction that individuals experience and their resultant cognitive, behavioural, and affective responses (Deci & Ryan, 2000). Sport research based on BNT has revealed an autonomy-supportive coaching interpersonal style to positively link to the satisfaction of the basic needs which corresponds to enhanced self-determined motivation (Mageau & Vallerand, 2003) and increased feelings of well-being (Blanchard et al, 2009). In the present study, we extended this literature by examining the relationship of coach-provided autonomy support to individual player perceptions of the experience of well- and ill-being evident on the team. Another feature of the social environment emphasised within SDT (Bartholomew et al, 2010a) is a controlling interpersonal style, which is characterised by coercive, pressurising, and authoritarian behaviours (Bartholomew et al, 2010a). In this study, we were interested in the relationships of players' perceptions of both coach controlling

and autonomy supportive behaviours, and perceived team referenced need satisfaction and well- and ill-being.

In sum, the main aims of this study were to i) examine a motivational sequence capturing hypothesised relationships between athletes' perceptions of their coaches' autonomy supportive and controlling behaviours and athletes' views of the degree of basic need satisfaction experienced by the team as a whole and positive and negative indicators of team well-being (i.e., subjective vitality) and ill-being (i.e., physical and emotional exhaustion), and ii) test the theoretically assumed mediating role of BPNS in the relationship between the targeted dimensions of the coaching environment and the targeted team-referenced well- and ill-being indices.

Method

Participants and Procedures

Study participants were 246 (59.3% females, 40.7% males; *M* age = 17.22 years; *SD* = 1.81) elite level junior field hockey players from across the UK. In contrast to the other studies presented in this thesis, team cohesion (including dimensions of task and social cohesion) were omitted from the analyses within this study due to the large number of items measured relative to the sample size of the elite hockey players. The primary aim of this study was to examine the interplay between team-referenced variables tapping into the coach-created environment, the BPNs, and well- and ill-being.

Measures

Coach-Created Environment

Athletes completed the 7-item measure of autonomy supportive coaching (Williams,

Grow, Freedman, Ryan, 1996; adapted for sport by Reinboth & Duda, 2006). Items were preceded by the instructions “...please respond to each statement thinking about how your coach interacts with your team mates/team as a whole.”

Fifteen items were used to tap athletes’ perceptions of coach controlling behaviours (Bartholomew et al, 2010). Both scales have demonstrated good content and factorial validity, as well as internal consistency and invariance across gender and sport type (e.g., Adie et al, 2008; Bartholomew et al, 2010). Responses for both scales were indicated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Team-Referenced Basic Psychological Need Satisfaction

The items contained within the psychological need satisfaction scales outlined in chapter two (i.e., autonomy, competence, relatedness to coach) were adapted to assess players’ satisfaction of the psychological needs in the case of the team as a whole unit. Specifically, players responded to items adapted to reflect team-referenced satisfaction of the need for autonomy (e.g., “We had a say regarding what skills we wanted to practice”), competence (e.g., “We were pretty skilled at hockey”), and relatedness to coach (i.e., “We felt valued by our coach”). Satisfaction of the need for relatedness to coach, rather than relatedness to teammates employed in chapter three, was adopted for this study with the intention of comparing whether one method is a better representation of this basic psychological when exploring this dimension in a team sports context.

Team Well- and Ill-Being

Feelings of vitality/energy were measured by the six-item version of the Subjective Vitality Scale (Ryan & Frederick, 1997) and adapted to refer to how the team was perceived to be feeling (e.g., “We felt alive and vital.”). Players’ perceptions of the degree of emotional

and physical exhaustion evidenced on the team, was assessed using a slightly adapted version of the five-item emotional and physical exhaustion subscale from the Athlete Burnout Questionnaire (Raedeke & Smith, 2001) (e.g., “We were exhausted by the mental and physical demands of hockey.”)

Data Analysis

Structural equation modeling was employed (using Version 19 of the AMOS software) (Arbuckle, 2007) and the recommended two-step approach (Kline, 2005; Byrne, 2010) was applied. It has been demonstrated that χ^2 values are affected by sample size (Hu & Bentler, 1999). Due to the relatively small sample size in this study, absolute and incremental fit indices were considered as more accurate values when assessing whether the hypothesized model accurately represented the data. The standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) were chosen as indicators of absolute fit (Hu & Bentler, 1999). RMSEA values close to .06 and SRMR values close to .08 have been deemed to indicate a model with good fit to the data (Hu & Bentler, 1999). The incremental fit indices were represented by the comparative fit index (CFI). Values equal to or greater than .95 are considered the cut criterion to indicate models with good fit (Hu & Bentler, 1999), although values equal to or greater than .90 have been used to indicate models with acceptable fit. Confirmatory factor analyses of the measures, and any theoretically justified modifications to the measurement model were made, until the fit indices were considered acceptable. The next step was to test whether the data provided an adequate fit to the hypothesised structural model.

The approach proposed by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) was the preferred method for assessing direct and indirect effects between variables within the overall structural model. In models where potential multiple mediators are evident, this

method enables the assessment of the significance of each mediator and tests the extent of their effects in the overall model. This involved the testing of the indirect effect of perceptions of autonomy supportive and controlling environments on each dependent variable (i.e., vitality and PEE) via each BPN (i.e., competence, relatedness to coach, and autonomy), respectively. As recommended by MacKinnon (2000), the significance of the joint coefficients of each mediation effect was also tested. Using this approach enables researchers to determine the degree and significance of the specified mediated effects via each of the three BPNs (MacKinnon, 2000). The standardized coefficients used to calculate the mediation analyses were taken from the structural equation modeling analysis conducted in AMOS.

Results

Following initial CFA, problematic items within the measurement model were removed in a step-by-step fashion and model fit improved without sacrificing the hypothesized model structure (Hofmann, 1995). Two items were removed from the autonomy scale due to poor factor loading (i.e., the reverse item ‘We had to force ourselves to play hockey’ and ‘We participated in hockey because we wanted to’). The removal of these items was also justified on conceptual grounds as it was felt that these items captured different motivation regulations to engage in hockey rather than the satisfaction of the basic need for autonomy experienced during hockey. Item six of the vitality scale, ‘Sometimes we felt so alive we wanted to burst’ was removed due to poor factor loading. Following the parceling approach outlined in Little et al, (2002), CFAs for the controlling climate and autonomy supportive scales demonstrated good fit. Following alterations outlined above, the fit indices for the overall measurement model were improved $\chi^2 = 871.47$ (443); CFI = .90; RMSEA = .06 (95% CI = .058-.062); SRMR = .07.

Table 4.1 presents descriptive statistics and alpha reliability coefficients, and correlations for all of the scales. Overall, this sample of elite hockey players considered their coaching climate to be high in autonomy support, and moderate in controlling features. The players' perceived team competence was high and their needs for autonomy and relatedness were also satisfied. Players reported that they perceived the team's levels of vitality to be high and the experience of emotional and physical exhaustion on their team to be moderate.

The data demonstrated an acceptable fit to the hypothesized BNT based model: $\chi^2 = 883.72$ (447); CFI = .91; RMSEA = .06 (95% CI = .058-.062); SRMR = .08 (Figure 4.1). All paths from perceived autonomy support to autonomy, competence, and relatedness satisfaction were significant. The hypothesized paths between a controlling coach climate and competence, and the path with relatedness to coach were significant and negative. In addition, there were significant paths between the satisfaction of the three basic needs and vitality. The path between autonomy and vitality was non-significant. Consistent with previous literature, satisfaction of the needs for feeling relatedness to the coach and competence were significantly and negatively related to physical and emotional exhaustion. Contrary to our hypothesis, a positive path emerged between the need for autonomy and physical and emotional exhaustion. A significant and negative correlation emerged between a controlling coach environment and an autonomy supportive environment.

Testing Mediation

The approach advocated by MacKinnon et al (2002) was employed to determine the significance of the indirect effects in the model. The standardized coefficients for this analysis were taken from the overall structural model, which tested the effects of autonomy supportive and controlling coach environments simultaneously.

Table 4.1 Descriptive statistics, alpha coefficients, and correlations of the measures

	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7
1. Controlling Climate	2.57	.55	.83	-						
2. Autonomy Supportive Climate	3.71	.58	.80	-.34**	-					
3. Competence	4.90	.86	.81	-.30**	.37**	-				
4. Autonomy	3.60	1.10	.81	-.21**	.40**	.48**	-			
5. Relatedness to Coach	3.82	.65	.87	-.40**	.63**	.50**	.51**	-		
6. Vitality	4.40	1.19	.92	-.30**	.41**	.60**	.37**	.56**	.40**	-
7. Exhaustion	3.00	.81	.90	.39**	-.23**	-.26**	-.21**	-.41**	-.12*	-.44**

¹ Note. Measures for *Autonomy*, *Competence*, and *Vitality* used a 7-point Likert scale. All other measures used a 5-point Likert scale.

* $p < .01$, ** $p < .001$

Table 4.2 Direct and indirect effects via each need between each independent and criterion variable pairing

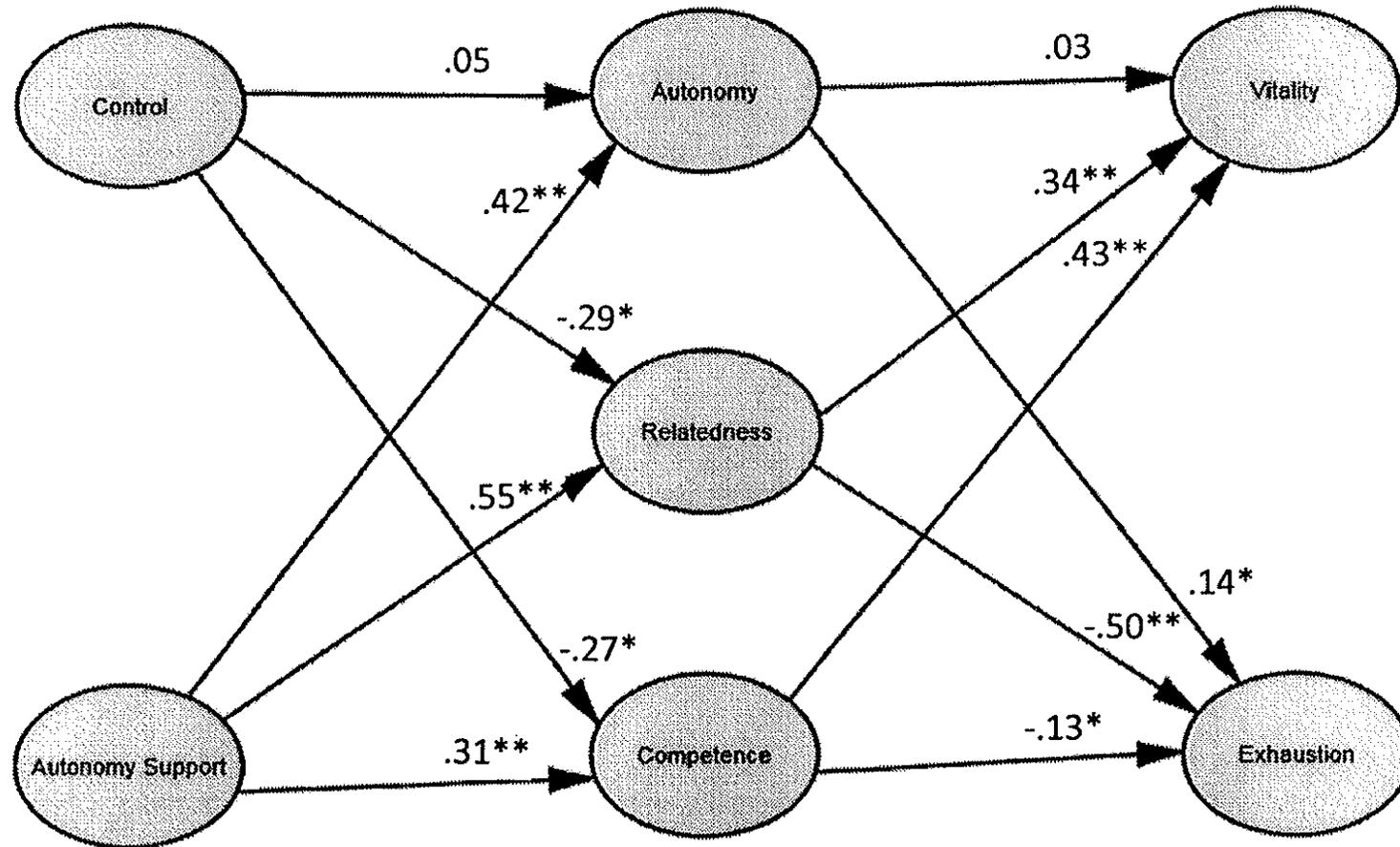
Independent Variable	Criterion	Direct Effect	Indirect Effect		
			Autonomy	Competence	Relatedness
Autonomy Supportive Climate	Vitality	.34**	.02	.13* ^a	.19* ^a
	Exhaustion	-.26**	.06* ^a	.04	-.28** ^a
Controlling Climate	Vitality	-.22*	-.001	-.05* ^a	-.10* ^a
	Exhaustion	.18*	.005	.04	.10* ^a

Note. Standardized beta coefficients are presented.

The indirect effect was statistically significant ($z > 1.96$) * $p < .01$, ** $p < .001$

^a Denotes a relationship in which there was evidence of mediation.

Figure 4.1 Structural model of the associations between perceptions of the coaching climate, BPNS, and well-being/ill-being



N.B. All coefficients presented are standardized and significant (* $p < .05$; ** $p < .01$)

The reported indirect effects and results of the mediation tests are presented in Table 4.2. Satisfaction of the need for relatedness to the coach was a significant mediator in the relationships between perceptions of an autonomy supportive climate and both vitality and exhaustion outcomes. Relatedness to coach was also a significant mediator between a controlling coaching climate and both vitality and exhaustion. The need for competence was a significant mediator in the relationship between an autonomy supportive coaching climate and vitality, and similarly competence was found to mediate the relationship between a controlling coach environment and vitality. The need for autonomy played a mediational role in the relationship between an autonomy supportive climate and the experience of physical and emotional exhaustion.

Discussion

This study examined the interrelationships between player perceptions of the coaching environment, basic needs satisfaction, and positive and negative indicators of emotional health/optimal functioning when these variables are referenced for the team as a unit (i.e., when the key constructs are operationalised in terms of individual player perceptions of how the overall team was feeling and functioning). A second aim was to test the hypothesised mediating role of BPNS in the relationship between dimensions of the coaching environment and targeted team well- and ill-being indices. Findings from this study provide partial support for the tenets of Basic Needs Theory (Deci & Ryan, 2000).

Perceptions of the Coaching Environment and Team Need Satisfaction

As hypothesised and consistent with past work (Balaguer et al, 2012; Adie et al, 2008), direct relationships between autonomy supportive and controlling features of the coach-created climate and athletes' views of their teams' experiences of subjective vitality and

physical and emotional exhaustion were significant in the overall model. Similar to the findings of Pelletier and colleagues (2001), our results suggest that the two targeted climate dimensions (i.e., controlling and autonomy supportive coaching behaviours) tap into different facets of the over-riding coaching environment and are not at opposite ends of a bi-polar continuum.

The observed positive paths between an autonomy supportive climate and the satisfaction of the needs for competence, autonomy, and relatedness are aligned with previous sport research when reported needs satisfaction is referenced to the individual athlete (Adie et al, 2008). The path between an autonomy supportive coaching environment and perceived team relatedness to coach was strong ($\beta = .55^{**}$) and similar to what has been found in previous research in sport and dance contexts (Adie et al, 2008; Quested & Duda, 2010; Balaguer et al, 2012). Our findings suggest that a coaching environment that encourages teams to act out of their own volition, provides team members with choice, and emphasizes self-endorsed participation, nurtures a sense in players that their team as a whole feels valued and supported by the coach.

In the overall model, the pathways between a controlling-coach climate and relatedness to coach and competence were significant and negative. Observed beta-coefficients were not as strong as those found for autonomy supportive features of the coaching climate and satisfaction of these two needs which is consistent with previous work by Balaguer et al, (2012). These results indicate that an environment that is high in controlling facets may diminish hockey players' perceptions of team competence and decrease feelings of the team as a whole feeling valued, supported, and cared for by the coach.

No significant path was found between a controlling-coach environment and autonomy

where we would expect a negative association to be evident. This finding may be due to the perceived controlling features of the environment being lower in comparison to the autonomy supportive features in this study. That is, it could be that the controlling coach behaviours were not potent enough to diminish a sense of autonomy in the team (in the view of the individual players).

In our study, perceived controlling coach behaviours were weak or non-significant predictors of team-referenced BPNS. Previous research utilizing the Controlling Coach Behaviour Scale has revealed inconsistent results in the relationship between a controlling coach-created environment and the satisfaction of the three basic psychological needs (Balaguer et al, 2012). Recent research has indicated that the effects of controlling features of the coach-created climate on player functioning may be more clearly demonstrated through the examination of relationships to the thwarting of the basic psychological needs (Bartholomew et al, 2011; Balaguer et al, 2012). Future research testing BNT in terms of how the team is perceived to feel is warranted which includes assessments of both satisfaction and thwarting of the basic psychological needs.

Team Need Satisfaction and Players' Reported Team Well- and Ill-Being

Aligned with previous sport research (Reinboth & Duda, 2006) and studies conducted in other physical activity domains (Quested & Duda, 2010), relatedness emerged as the strongest predictor of the targeted indicators of team well- and ill-being; namely, subjective vitality and physical and emotional exhaustion, respectively. These findings highlight the important role of the coach in creating an atmosphere in which the collective membership of a team is more likely to feel valued, listened to, and supported, as such an environment can result in positive team outcomes. Hockey players' views regarding the overall team's feelings of competence

were strongly related with team. This relationship between the satisfaction of the need for competence and vitality is consistent with previous research where such associations were explored with reference to individual player perceptions (Reinboth et al, 2004; Adie et al, 2010) and aligned with research demonstrating the heightened experience of positive well-being outcomes as a consequence of team collective efficacy (Price & Weiss, 2013).

Past sports research supports the BNT assumption (Ryan & Deci, 2000) that satisfaction of the need for autonomy positively predicts well-being indicators and negatively relates to ill-being outcomes (Reinboth & Duda, 2006; Stebbings, Taylor & Spray, 2011). However, we found no significant association between hockey players' reported perceptions of the need for autonomy and perceived vitality when these variables were referenced to the team. Also, contrary to our hypothesis, a significant positive association was found between satisfaction of the need for autonomy and physical and emotional exhaustion. This latter finding is not consistent with previous research exploring the concomitants of basic needs within sport and other physical activity settings these studies revealed no significant relationships between autonomy need satisfaction and exhaustion when referenced to the individual athlete or dancer (Adie et al, 2010; Quested & Duda, 2011).

The observed positive relationship between autonomy and physical and emotional exhaustion may be a function of when the present cross-sectional data were collected. The data collection took place during the selection phase prior to the most intense competitive period of the season for these elite teams. It could be the case that players within this age group (aged 12 to 21 years) may be unfamiliar with situations where they are encouraged by the coach to take an active part in decision-making and to voice their opinions during training sessions. Given that this was the period of the season when team selections are made, players may be particularly uncomfortable with this new found 'freedom' and especially concerned

about making a wrong choice. The greater possibility of feelings of unfamiliarity and uncertainty surrounding players in this elite squad setting, and the experience of heightened emotional stress at this time, may explicate the observed link between autonomy and physical and emotional exhaustion. It could also be the case that during the selection phase of the season when there is a large emphasis on performing well, those players given greater autonomy may have chosen to work even harder in training and competition. As a consequence of this heightened exertion and focus on selection, the emotional and physical exhaustion of the team may have been exaggerated.

A further limitation of this research may be whether it is possible to accurately perceive feelings of well- and ill-being in others (i.e., using the team-referenced approach employed). Although this study provides some support for the measurement of vitality and exhaustion when referenced for the team, further examination of the team-referenced conceptualisation of the well- and ill-being variables would best be tested using a multilevel analyses within-teams (i.e., relationships between variables for individual athletes participating within teams) and between-teams (i.e., relationships between variables and testing the effects for differences between distinct teams) to examine the extent to which there is agreement between players within teams regarding their perceptions of well- and ill-being experienced by teammates.

Team BPNs as Mediators Between the Perceived Coach-Created Environment and Reported Team Well- and Ill-Being

Mediation analyses showed that relatedness to coach had significant indirect effects between the coaching environment and the targeted measures of team health (i.e., subjective vitality and physical and emotional exhaustion) when variables were referenced for the team as a whole. The latter finding is consistent with Reinboth and Duda (2006) who found

relatedness to be a mediator of the relationship between an autonomy supportive coaching climate and subjective vitality, when satisfaction of the need for relatedness was individually-referenced and also when assessed with respect to the player-coach relationship. The coach has a key responsibility for selecting the squad and the players' perceptions of their relationship with the coach may have held greater importance during the selection phase of the season. When players' perceptions of the team's relatedness to the coach is high, it is likely to have a positive effect on feelings of team well-being (i.e., in this case, subjective vitality on the team). Conversely, in situations when the team's relationship to the coach is perceived to be poor, players are more likely to sense that the team is physically and emotionally exhausted. These findings highlight the important role that the coach may play in terms of the quality of his or her relationships with players in teams and in influencing adaptive or maladaptive psychological and emotional team outcomes.

Other studies have not found relatedness to be a significant mediator when it comes to the links between the coach-created climate and well- and ill-being outcomes which are referenced to the individual (Adie et al, 2008; Quested & Duda, 2011). Such discrepancies in the literature might be a function of whether relatedness was assessed specifically in relation to the coach (present study; Reinboth & Duda, 2006) or in regard to overall feelings of relatedness in the particular sport setting that potentially takes into consideration perceived connectedness to both coach and teammates (Adie et al, 2008). In the present research, satisfaction for the need of relatedness to coach was assessed in terms of individual players' perceptions of relatedness for the team as a whole.

We also found that satisfaction of the need for feeling of competence on the team to be a significant mediator in the path between autonomy support and team vitality. This finding is consistent with previous research in sport and vocational dance where the importance of the

need for competence has been demonstrated (Gagne et al, 2003; Reinboth et al, 2004; Quedstedt & Duda, 2010; Adie et al, 2012; Balaguer et al, 2012). Autonomy supportive coach-created climates are much more likely to foster feelings of competence which can then contribute to positive affective outcomes in the case of individuals and, based on present findings, individuals' views regarding the state of affairs on their team as a whole. Situations where the coach behaviours are perceived as more controlling, tends to diminish players' feelings of competence and lead to a greater likelihood of players experiencing negative outcomes (i.e., physical and emotional exhaustion). This study indicates that these relationships also hold up when individual players perceive levels of competence for the team as a whole.

Future Directions

Future research would be well placed in focusing on the simultaneous examination of individual-referenced and team-referenced player perceptions of the relevant variables in the BNT sequence. By adopting a multi-level analytical approach, information on both individually-referenced and team-referenced player perceptions of the variables within BNT would enable the examination of differences in needs satisfaction and health outcomes within and between teams (Papaioannou et al, 2004; Taylor & Lonsdale, 2010). Assessment of the basic needs and well- and ill-being indices when both individually-referenced and team-referenced, will also enable researchers to investigate alternative statistical methods of capturing the measurement of these motivation-related factors at team-level. For example, researchers would be able to explore whether a team-referent approach to the examination of the psychological needs and well-being, similar to the approach adopted in the assessment of collective efficacy (Feltz & Lirgg, 1998), is a more accurate method of capturing motivation at a team-level as opposed to aggregated individually-referenced perceptions.

Conclusions

The findings support the value of considering strategies that enhance autonomy-supportive facets of the coaching environment and also highlight the importance of feeling connected to the coach through feelings of being valued, listened to, and supported. Satisfaction of the need for competence was shown to be high in this sample of young elite hockey players and was also a significant mediator in the associations between both autonomy supportive and controlling features of the coach-created climate and team vitality in the theoretically expected directions. Overall, this study provides support for BNT (Deci & Ryan, 2000) as a means of understanding social environmental factors, psychological processes, and healthy or compromised participation in young elite team sport athletes when the variables are referenced to reflect players' perceptions of the experiences of the whole team.

CHAPTER 5

**BASIC PSYCHOLOGICAL NEEDS THEORY AND THE INTEGRATION OF TEAM
COHESION IN THE EXAMINATION OF OPTIMAL FUNCTIONING WITHIN AND
BETWEEN SPORTS TEAMS**

Abstract

This study attempted to extend existing research by integrating a group dynamics construct (i.e., team cohesion; Carron et al, 2002) within a contemporary theory of motivation, namely basic psychological needs theory (BNT; Deci & Ryan, 1985), in an attempt to further our understanding of optimal functioning within and between sports teams (Duda, 2001; Duda & Balaguer, 2007; Karreman et al, 2009). The specific aims of this study were: i) to explore the role of task cohesion as both an antecedent of BPNS and as an outcome indicator of optimal functioning within the BNT framework, and ii) to test the theoretically assumed mediating role of BPNS in the relationship between the targeted dimensions of the coaching environment and the targeted indices of optimal functioning both within and between teams and including task cohesion as an antecedent and an outcome. Multilevel structural equation modeling (MSEM) enabled the examination of within-team effects and between-team effects associations of the BNT related variables and task cohesion. Findings revealed that task cohesion was better positioned as an outcome rather than an antecedent in the BNT sequence. Tests of indirect effects reinforced the important role of competence need satisfaction as a mediator in the relationships between autonomy supportive coaching and vitality for teams as a whole. Between-team effects also indicated that an autonomy supportive coach created environment may be considered a team variable (i.e., perceptions shared by players within the same team are more similar than when compared to players on other teams).

Within elite sport, the often cited “ten thousand hours of training over ten years” has been endorsed by national governing bodies as the required target for assisting the development of elite athletes towards world class performance (Ericsson & Charness, 1994). However, it is recognized that many young athletes fail to maintain sufficient engagement in their sport through these critical years of adolescent development (Rowe, 2012). The potential maladaptive consequences that result from young athletes’ negative experiences during their sports participation include performance anxiety (Smith et al, 2007), low self-esteem (Papaioannou et al, 2013), and burnout (Lonsdale et al, 2009), leading many young athletes to drop out from their sport altogether (Quested et al, 2013). In response, understanding the key components that determine optimal functioning, and therefore influencing the sustainable participation and development of talented athletes, has received greater attention in recent years (Baker et al, 2003; Sarrazin et al, 2002).

It is well established that the social environment surrounding athletes is one of the most influential contributors to the sustainability of athlete motivation and well-being during their participation in sport (Duda & Balaguer, 2007; Ntoumanis, 2012). In particular, the coach-created environment has been recognized as a key factor influencing ongoing athlete engagement and positive functioning (Duda & Balaguer, 2007; Duda et al, 2014). In addition to coach-created environments, further evidence supports the role of the interactions between peers or teammates (i.e., team cohesion) as an important component in determining healthy participation in sport (Ntoumanis, 2012). As a consequence, over many years research has been directed towards understanding the role of the coach-created environment and team cohesion contributing to athlete’s motivation and sustained participation within team sports settings in particular (Morgan, Fletcher, & Sarkar, 2013).

The purpose of the current study was to provide further understanding of how the coach-created environment and team cohesion contribute to athletes' optimal functioning when they are operating in teams by integrating key theories from the optimal functioning (i.e., Basic Psychological Needs Theory; BNT; Deci & Ryan, 2000) and group dynamics (i.e., team cohesion) literatures. This research also extends the existing literature within sport psychology by considering a methodological approach that enables the separate examination of individual athletes' optimal levels of functioning *within* teams, but also conceptualizes and explores these psychological relationships when comparisons in these processes are tested *between* distinct teams.

The social environment and basic psychological needs satisfaction in teams

A popular approach to understanding the social psychological factors that contribute to optimal functioning in teams is basic psychological needs theory (BNT; Ryan & Deci, 2000, 2002). BNT, a mini-theory within self-determination theory (SDT; Deci & Ryan, 1985, 2000), considers that one's feelings of autonomy, competence, and relatedness are central to the extent to which well-being is experienced. The satisfaction of the need for autonomy is demonstrated when an individual feels they are acting in accordance with their personal values, are provided with choice and enabled to act through their own volition in alignment with their values and beliefs (Mageau & Vallerand, 2003). The satisfaction of the need for competence is experienced when individuals feel that they have the ability to meet the demands of their particular sport (White, 1959). Finally, satisfaction of the need for relatedness may be experienced when individuals feel securely connected to and understood by others (Baumeister & Leary, 1995). BNT-related research highlights the degree to which the coach-created environment is autonomy supportive determines the extent to which an athlete's basic psychological needs are satisfied (Balaguer, et al, 2012). Autonomy

supportive coaching environments are categorized by the coach providing athletes with choice and a clear rationale for tasks engaged in during training and competition. Coaches also seek to understand and acknowledge athletes' feelings and provide task-focused feedback on performance (Mageau & Vallerand, 2003). There is extensive research supporting the role of autonomy supportive coaching in positively predicting satisfaction of the three basic psychological needs in youth sports team athletes (Adie et al, 2010; Adie et al, 2012; Balaguer et al, 2012). Much of this research has conceptualized testing of the BNT process model through individual athletes' perceptions of the coach-created environment when in training and competition (i.e., within teams) (Adie et al, 2010; Adie et al, 2012; Balaguer et al, 2012).

The Role of Team Cohesion Within the Basic Needs Theory

The integration of team cohesion within the BNT process model may further our understanding of optimal functioning for team athletes and has recently been tested in team based sports (see Chapter Three). Team cohesion has been described as a key determinant in influencing interpersonal relationships within team environments (Evans et al, 2013) and is defined as a dynamic process “that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs” (Carron et al, 1998, p213). Team cohesion includes facets of both task and social cohesion. Task cohesion is typically defined by the degree to which members of a group work together to achieve common goals. The degree to which members of a team like each other and enjoy one another's company defines social cohesion (Carron et al, 1998).

Previous research has established an association between cohesion and the satisfaction of the BPNs, which in turn has been related to the experience of well-being in sport (Taylor &

Bruner, 2012). Previous research has also demonstrated that BPNS mediates the relationships between dimensions of the social environment (i.e., controlling coach-created climate) and task cohesion with targeted outcomes (i.e., satisfaction in playing basketball and positive emotions) in basketball players (Blanchard et al, 2009). More recently, Merrett and colleagues provided evidence indicating that task and social cohesion could be-positioned as both antecedents and outcomes within the BNT process model (see chapter 3). They also found that the relationships between task cohesion and basic psychological needs satisfaction (BPNS) were stronger than the observed associations between social cohesion and BPNS. Although previous research has confirmed that cohesion can be integrated into the BNT process model, its (i.e., cohesion) position in the model (as a predictor or outcome) requires further attention. Furthermore, previous studies have primarily examined cohesion within the BNT process model from an individual level perspective and thus there is limited understanding of what role team cohesion plays within BNT when analysed at the team level.

Interdependence and testing optimal functioning in teams

In addition to the need for further examination of the positioning of team cohesion within the BNT process model, there is a dearth of research exploring how the associations between the BNT-related variables and task cohesion impact on levels of optimal functioning. An understanding of the processes contributing to optimal functioning is relevant for individual athletes within teams but also for comparing the perceptions of athletes participating within separate and distinct teams. BNT maintains that the satisfaction of the basic needs, as a requirement for personal growth and optimal functioning, is a universal concept (Deci & Ryan, 2000). The universality hypothesis of BNT has been supported in the sport context, with previous research supporting the links between BPNS and optimal functioning in youth sports team athletes (Adie et al, 2008; Balaguer et al, 2012) and dancers

(Quested & Duda, 2010) at an individual level (i.e., individual athlete perceptions of the BNT-related variables). In alignment with the universality hypothesis, it is been demonstrated that the relationships within BNT also hold across different demographic parameters (e.g., age, gender, ethnicity) and social/cultural contexts (e.g., nationality, cultural values and beliefs) (Deci & Ryan, 2000; Barkoukis et al, 2010; Deci et al, 2001; Taylor & Lonsdale, 2010). Chapter Three of this thesis also supported the universality hypothesis with evidence of invariance across competitive levels (i.e., elite and non-elite competition). Thus, it is reasonable to assume that when BNT is examined within sport teams, the relationships proposed by the process model will manifest for individual members' perceptions of the BNT-related variables. There is also likely to be evidence of these perceptions of BPNS and well-being being shared for athletes participating within the same team.

This experience of “sharedness” is described in the literature as interdependence. Interdependence has been defined as the “degree and manner in which group members rely on one another and require reciprocal interaction” (Johnson & Johnson, 2005, Evans et al, 2014, p.514; Eys, Jewitt, Evans, Wolf, Bruner, & Loughhead, 2013). Thus, in team sports where there are greater levels of interdependence, the degree to which perceptions of the autonomy supportive coach-created environment are “shared” between teammates, for example, may be greater in comparison to teams where there is less closeness between teammates. Likewise, the higher levels of interdependence between teammates may also be reflected in athletes' perceived levels of cohesion. These “shared” experiences of the coach-created environment and team cohesion are likely to subsequently affect individual athlete well-being and optimal functioning for the individual athletes within a team (Langfred, 1998; Pescosolido & Saavedra, 2012). For example, individuals in the same team who are exposed to the same

social environmental conditions (i.e., autonomy support, cohesive team) are likely to be more similar in their self-reported feelings of BPNS and vitality (Papaioannou et al, 2004).

Thus, it is important when examining the process model proposed by BNT that the appropriate methods of analysis are employed to separate effects that are manifesting within teams (i.e., relationships between variables for individual athletes participating within teams) and between teams (i.e., examination of relationships between variables shared by members of the same team) (Duda, 2001; Karreman et al, 2009; Ludke et al, 2009). In the two hypothesized process models [i.e., Model 1 (Figure 5.1) and Model 2 (Figure 5.2)] the associations between the BNT-related variables and cohesion may be tested in a framework that positions team cohesion as an antecedent alongside autonomy supportive coaching as social environmental constructs that are shared by athletes within the same team but examined at the individual level (i.e., at level 1 but clustered to represent players of distinct teams). These shared team constructs (i.e., autonomy support and task cohesion) may also be predictive of BPNS (at level 1), and subsequently well-being as an outcome at an individual level (i.e., level 1). Thus, the method of analysis should involve the testing of a 1-1-1 model that allows for the separation of effects for the relationships that are operating both for individual players within teams and clustered to enable examination of effects between teams.

Objectives of the present study

In sum, this study aimed to extend previous research exploring the integration of BNT-related and multi-dimensional team cohesion by providing further examination of the relationships operating between these variables within and between teams. The first aim of this study was to explore the role of task cohesion as both an antecedent and outcome within the BNT framework across two hypothesized structural models (i.e., Models 1 and 2) utilizing a 1-1-1 design. Secondly, the theoretically assumed mediating role of BPNS in the

relationships between the targeted dimensions of the coach-created environment [i.e., autonomy supportive coaching (and task cohesion in Model 1)] and the targeted indices of optimal functioning [i.e., subjective vitality (and task cohesion in Model 2)] within and between teams was tested.

Method

Participants and Procedures

Thirty-eight youth hockey teams comprising a total of 462 players (249 elite; 214 non-elite) were recruited from across the UK during their squad training sessions. The players' age ranged from 11-21 years (M age = 16.11 years; SD = 2.12) and included 186 male and 276 female participants.

Data Analysis

Prior to running the analysis for any hypothesized structural model at multiple levels of analysis (i.e., within-team and between-team effects), it is necessary to assess within-team agreement for all variables by means of the Average Deviation Index (ADI) using the recommended approach by Dunlap, Burke and Smith-Crowe (2003). Determining inter-rater agreement is required to assess whether the levels of agreement within teams are sufficiently strong so that one can trust that the average opinion of a group is interpretable or representative of the group (Dunlap, Burke, & Smith-Crowe, 2003). When the apparent agreement for the group is sufficiently different from chance it can be concluded that some agreement exists within groups (Dunlap et al, 2003). To interpret the ADI values, Burke and Dunlap (2002) recommend using the criterion of $ADI < c/6$, where c is the number of response alternatives. In this study, regarding ADI values, the practical cut-off value for a Likert-type response scale with five options was .83 or less; for a Likert-type response scale

with seven options was 1.17 or less, and for a Likert-type response scale with nine options was 1.50 or less. In addition, between team discrimination was tested by using one-way analysis of variance (ANOVA).

Multilevel structural equation modeling (MSEM) was employed to assess two hypothesized structural models using version 6.12 of Mplus software (Muthén & Muthén, 1998-2010) with robust maximum likelihood (MLR) estimation. MSEM has been proposed as an alternative to traditional MLM as a means to separating and estimating between- and within- effects for clustered data (Preacher, Zyphur, & Zhang, 2010; Preacher, Zhang, & Zyphur, 2011; Lachowicz, Sterba, & Preacher, 2014). This approach also enables investigators to estimate more complex models by decomposing variance into components at the between and within levels and providing a more precise estimation of indirect effects when examining mediation compared to the traditional multilevel approach (Preacher et al, 2010).

Following Zhang, Zyphur and Preacher (2009), the two hypothesised models in this study were 1-1-1 models, in which a Level-1 antecedent influences a Level-1 mediator which then affects a Level-1 outcome. A first model (Model 1) was created to test the relationship between the level 1 predictors (autonomy supportive coaching and players' perceptions of task cohesion) with BPNS (i.e. satisfaction of the need for autonomy, competence, and relatedness to coach) and vitality as individual level (level 1). A second model (Model 2) examined the top down relationship between the level-1 predictor (autonomy supportive features of the coach-created environment) with BPNS and vitality and task cohesion (indicators of optimal functioning) as individual level outcomes (level 1).

Model fit was assessed using the chi-squared statistic and goodness-of-fit indices. The root mean square error of approximation (RMSEA) and the standardized root mean square

residual (SRMR) were chosen as indicators of absolute fit (Hu & Bentler, 1999). RMSEA values of approximately .05 or less indicate a close fit of the model. Values of about .08 or less indicate a satisfactory fit of the model, and values greater than 0.1 indicate poor fit. An SRMR value of zero indicates perfect fit and less than .08 is considered a good fit (Hu & Bentler, 1999). The comparative fit index (CFI) and Tucker Lewis Index (TLI) were used as indicators of incremental fit. CFI and TLI values greater than or equal to .95 are considered the cut off criterion for models with a good fit to the data (Hu & Bentler, 1999) but typically values above .90 have been adopted as an indication of adequate model fit.

For testing the significance of the indirect (mediated) effects, the Monte Carlo (MC) confidence intervals were applied using the web utility provided by Selig and Preacher (2008). The MC method has been suggested as the only viable method for constructing confidence intervals for simple and complex indirect effects in multilevel modeling (Preacher & Selig, 2012). If the confidence interval does not include zero, the null hypothesis of no mediation is rejected.

Results

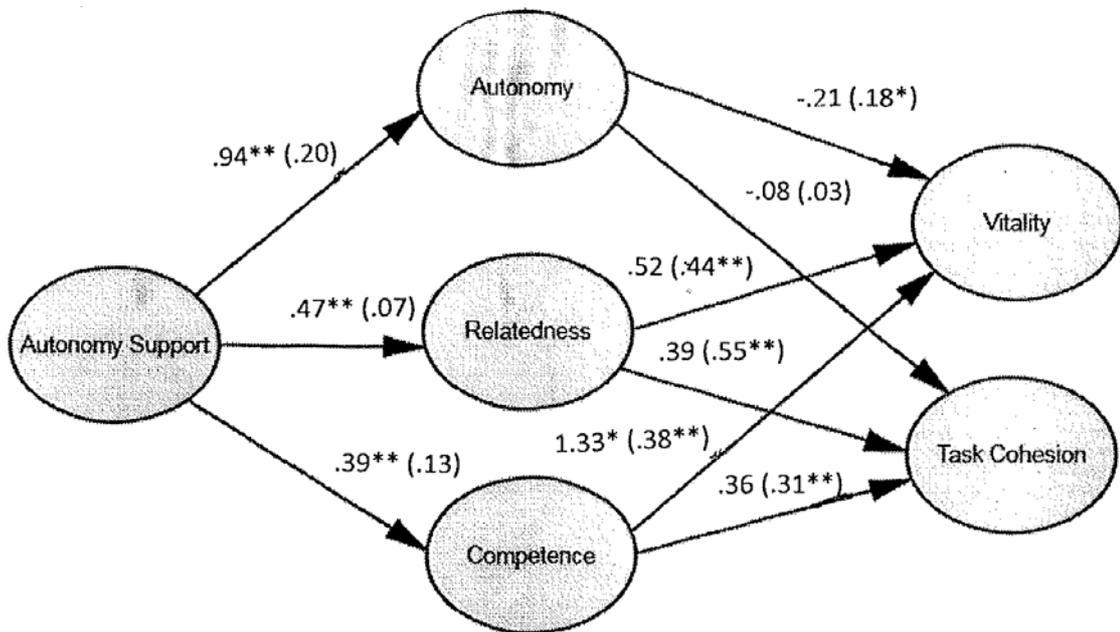
Table 5.1 provides a summary of the descriptive statistics, alpha reliability coefficients, and correlations between the variables of the study. The hockey players reported high perceived levels of autonomy support. Feelings of BPNS were above the mid-point with competence being the highest. Feelings of subjective vitality were also high for this player sample. The alpha reliability coefficients for all measures were above .70 indicating good levels of reliability (Nunnally, 1978). Intraclass correlation coefficients for all variables are reported in Table 5.2.

Testing the hypothesised multilevel structural models

Testing of both hypothesized models (Model 1 and Model 2) revealed that Model 2 (in which task cohesion is positioned as an outcome) has a good fit to the data, whereas Model 1 (in which task cohesion is positioned as an antecedent) indicated a poor fit. The goodness-of-fit indices are summarized in Table 5.3 confirming that Model 2 has the better indices overall. Figure 5.1 presents the significant and non-significant paths for the between team effects for Model 2. The parameter estimates reported are unstandardized and obtained as the default for the output within Mplus. The instructions for a 1-1-1 model were applied and adapted creating a model with fixed slopes (Zhang et al, 2009). However, when testing the resulting model with standardized estimates highlighted for the output, the model would not run without reported errors and therefore unstandardized estimates were utilised. In Model 2 perceptions of an autonomy supportive coach-created environment were predictive of BPNS [i.e., autonomy (Model 2: $\beta = .94$; $p < .001$) competence (Model 2: $\beta = .35$; $p < .001$) and relatedness to coach (Model 2: $\beta = .47$; $p < .001$)]. An examination of between effects relationships linking BPNS to vitality revealed that in Model 2: autonomy ($\beta = -.21$, $p > .05$), competence ($\beta = 1.33$, $p < .001$), relatedness to coach ($\beta = .52$, $p > .05$)] were significant. In Model 2, the paths between the three BPNS (i.e. autonomy ($\beta = -.08$, $p > .05$), competence ($\beta = .36$, $p > .05$), and relatedness to coach ($\beta = .39$, $p > .05$) to task cohesion were not significant.

The within team effects for the hypothesised relationships revealed positive significant relationships between BPNS and vitality in both models [Model 2: autonomy ($\beta = .18$, $p < .01$), competence ($\beta = .38$, $p < .001$), relatedness to coach ($\beta = .44$, $p < .001$)]. In Model 2 the within effects indicated BPNS of relatedness ($\beta = .55$, $p < .001$) and competence ($\beta = .31$, $p < .001$), but not autonomy ($\beta = .03$, $p > .05$), were predictive of task cohesion.

Figure 5.1. Structural model (Model 2) representing the between effects (and within effects) of the associations between perceptions of the coach-created environment with BPNS and vitality / task cohesion.



¹ NB. Unstandardized parameter estimates for within effects are indicated in brackets following the between effects values.

Satisfaction of the needs for autonomy, competence, and relatedness to coach were measured

Testing mediation in the hypothesised structural models

The Monte Carlo method was applied as the recommended method for constructing confidence intervals for simple and complex indirect effects in multilevel modeling (Preacher & Selig, 2012). For all confidence intervals that do not include zero, the null hypothesis of no mediation is rejected and significant mediated effects can be deduced (Preacher & Selig, 2012). A series of analyses of the path coefficients illustrating between team effects indicated

that in both models, competence was the only BPN that emerged as a mediator in the relationships between the coach-created autonomy-supportive environment and vitality. In order to test whether these findings indicated a fully mediated effect or a partially mediated effect, the path between autonomy support and vitality was added in Model 2. The path of the direct effect from autonomy support to vitality was not statistically significant ($\beta = .15$, $p > .05$) thus indicating that satisfaction of the basic psychological needs may be act as mediators in this relationship. Indeed, the Monte Carlo (MC) confidence intervals (CI) estimated for the mediated effect in Model 2 [$\alpha\beta = .520$; (.055 - 1.176)] confirmed that the relationship between autonomy support and vitality was fully mediated by competence.

Table 5.1. Descriptive statistics, alpha coefficients, and correlations of all the measures

	Range	<i>M</i>	<i>SD</i>	α	1	2	3	4	5
1. Autonomy Supportive Climate	1-5	3.25	.38	.75	-				
2. Competence	1-7	4.98	.95	.85	.19**	-			
3. Autonomy	1-7	4.43	1.03	.83	.31**	.47**	-		
4. Relatedness to Coach	1-5	3.92	.80	.93	.26**	.42**	.55**	-	
5. Task Cohesion	1-9	6.90	1.29	.91	.06	.37**	.29**	.42**	-
6. Vitality	1-7	4.66	1.24	.92	.15**	.55**	.47**	.52**	.46**

Table 5.2 Intraclass correlation coefficients (ICC) for all variables

	Autonomy Support	Autonomy	Competence	Relatedness	Vitality	Task Cohesion
ICC	.538	.196	.123	.152	.222	.112

Table 5.3. Comparisons of goodness-of-fit indexes for hypothesized structural models 1 and 2

Hypothesized Structural Model	X^2	<i>df</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>SRMR within</i>	<i>SRMR between</i>	<i>AIC</i>
Model 1	48.48	8	.93	.73	.10	.047	.075	6805.04
Model 2	9.864	4	.99	.92	.06	.016	.033	6769.35

Discussion

The specific aims of this study were: i) to explore the role of task cohesion as both an antecedent of BPNS and as an outcome indicator of optimal functioning within the BNT framework for players operating within teams and also between distinct teams, and ii) to test the theoretically assumed mediating role of BPNS in the relationship between the targeted dimensions of the coaching environment and the indices of optimal functioning both within and between teams.

The Positioning of Task Cohesion in the BNT Process Model

With regards to the positioning of task cohesion in the BNT process model, overall Model 2 (where task cohesion was considered as a correlate of BPNS) revealed a satisfactory model fit. The goodness-of-fit indices for Model 1 where task cohesion was positioned as an antecedent were unacceptable and therefore further discussion of this model was deemed unnecessary. The within effects in Model 2 indicate BPNS of relatedness and competence are predictive of task cohesion indicating that when players perceive themselves to be valued and cared for by their coach and also have feelings of competence in their ability as hockey players, they may be more inclined to work together with other teammates on team tasks and challenges. Perceptions of autonomy for individual athletes within teams appeared to be less important in influencing team members perceiving levels of task cohesion within their team. This finding supports the positioning of task cohesion as an outcome initially revealed in Chapter Three when two hypothesised structural models were tested across the elite and non-elite hockey player samples at an individual level.

However, in Model 2 all the between effects relationships linking BPNS to task cohesion were not significant. We may have expected that this greater sense of “sharedness”

between players within teams may also have been demonstrated through evidence of task cohesion within the same team. However, in this study, that was not the case. Findings revealed greater evidence for players' perceptions of task cohesion as being more individually referenced within teams rather than representative for all players within the team (i.e., a shared perception). It is likely that this finding is due to the limited time (i.e., up to six weeks maximum) that the players had spent together on their respective teams at this early stage in the season. There may be smaller cohesive groups within the larger team that have formed from previous seasons of playing together, but with the influx of new players into the team setting the overall levels of task cohesion, as perceived for the team as a whole, are likely to take longer to develop.

In sum, based on the findings from this study, task cohesion may be better positioned as an outcome in the BNT framework (i.e., Model 2) rather than as an antecedent (i.e., Model 1). However, these conclusions should be treated with caution due to the cross-sectional design of the study. Cross-sectional study designs rely on participant memory and their emotional state and perceptions at the particular time of the study. Future longitudinal studies with multiple and complete teams over a period of one to two seasons and utilizing a two-wave (e.g., Lonsdale & Hodge, 2011) or three-wave cross-lag panel design (Curran, Hill, Ntoumanis, Hall, & Jowett, 2016) are needed. Such studies would help build upon the evidence from this cross-sectional investigation and provide more compelling evidence regarding whether cohesion is best positioned as an antecedent or an outcome process model. The implications of the time of the season and different team situations could also be examined. In addition, the integration of diary design studies adopting analyses with random slope models would enable researchers to examine evidence of variability in individuals' perceptions of well-being over time and how much this mean rate of change varies between

individuals (Selig & Preacher, 2009).

The role of an autonomy supportive coaching environment

Although not a specific aim of this study, the findings provide further evidence for the important role that autonomy supportive coaching environments play in supporting the satisfaction of the BPNs and the subsequent development of positive functioning for players operating in teams as whole units. An autonomy supportive coaching environment is characterised by maintaining players' involvement in decision-making during training and providing meaningful choice with regards to team activities, and has consistently been linked to positive well-being outcomes (Amorose & Andersson-Butcher, 2007). In addition, coach-created environments that promote more autonomy supportive elements are considered to be more empowering and have increasingly been shown to be associated with sustained athlete participation over time (Duda, 2013).

In Model 2 perceptions of an autonomy supportive coach-created environment at the between-team level were predictive of BPNS and supports previous research where these relationships have been examined at an individual level alone (Amorose & Andersson-Butcher, 2007; Adie et al, 2008; Balaguer et al, 2012). However, when examined in regard to within team effects, the relationships between autonomy supportive coaching and BPNS were not significant. These findings provide an indication that perceptions of an autonomy supportive coaching environment are shared by members of the same team. In turn, autonomy supportive environments appear to hold important implications for BPNS and positive functioning for individuals within those teams. This provides further evidence for the importance of fostering autonomy supportive coach behaviours in training and competitive environments with young athletes.

The Mediating Role of Basic Psychological Need Satisfaction

Much of the existing research at an individual level supports the tenets of BNT (Deci & Ryan, 2000) in the notion that satisfaction of all three BPNs is required for individuals to truly experience well-being and optimal functioning (Deci & Ryan, 2002). This study also provides support for the role of BPNS as mediators within teams. However, there is little evidence from past studies to support the role of BPNS as mediators when examined both between teams and within teams. This study provides an extension to the literature by separating the between team and within team effects and highlighting that there are some differences occurring at these levels.

Findings from mediation analyses examining the effects between teams indicate that competence mediates the relationships between an autonomy supportive coach-created environment and vitality in Model 2. In contrast, the basic psychological needs of autonomy and relatedness to coach did not mediate the relationships between an autonomy supportive coach-created environment and vitality. This was also apparent when the within-team effects were examined for the relationships between the three psychological needs for individuals participating within teams. This is a key finding that provides an extension to our understanding of the competence need satisfaction as a determinant of well-being at the individual level (Adie et al, 2008; Balaguer et al, 2012; Machida et al, 2012) and indicates that feelings of competence may also hold particular importance for the experience of well-being and optimal functioning for teams as a whole. It is likely that the specific psychological need for competence is central to athletes' experiences of enhanced well-being (i.e., vitality), both for individual players within teams as well as for the team overall.

Limitations and Future Directions

In addition to the benefits that autonomy supportive coaching environments provide for the healthy development of youth elite athletes, the sports related literature has revealed that coaching styles where controlling features are prominent have been associated with compromised BPNS and even more consistently with active thwarting of the basic psychological needs (Bartholomew et al, 2010; Bartholomew et al, 2011). Thus, the simultaneous measurement of autonomy supportive and controlling features of the coach-created climate alongside tests of basic psychological need satisfaction and thwarting are required to provide a more balanced examination of athletes' perceptions of the extent to which their environment and training and competition is supportive or compromises their healthy development (Smith et al, 2013; Duda, 2013).

Recent literature examining the positive and negative consequences of the impact of coach-created environments on BPNS acknowledges the importance of the simultaneous examination of both measuring indicators of well-being and ill-being in athletes (Smith et al, 2013). Athletes who feel that their BPNs are satisfied in training and competition will typically experience more positive emotions (i.e., enjoyment, vitality, calm) thus reducing the likelihood of the less desirable consequences of compromised BPNS or needs thwarting such as low self-esteem (Papaioannou et al, 2014), anxiety (Smith et al, 2007), emotional exhaustion and burnout (Lonsdale et al, 2009).

Further exploration of how best to examine the BNT framework when it is applied to teams is required. To date, no research that has tested BNT has examined whether testing the experiences of basic need satisfaction and well-being when perceived for the team as a whole (i.e., team-referenced; see chapter four) and also aggregated for distinct teams. This approach would involve the measurement of individuals' perceptions of the feelings of need satisfaction and emotional experiences of the group (or teams as a whole) to which they belong.

According to the universality hypothesis of BNT proposed by Deci and Ryan (2000), it may also be possible that the relationships between dimensions of the coach-created environment, BPNS, and well-being/ill-being could also be evident when players' are operating in groups and reflect upon their perceptions of how their team/squad is feeling and functioning as a whole.

Conclusions

Findings from this study employing a multilevel structural equation modeling (MSEM) approach to analysis present an extension to previous work by providing evidence that some relationships between the BNT related variables that are not apparent at the team level (between-team effects) are significant at the individual level (within-team effects) including mediation effect of basic psychological needs satisfactions (BPNS). Findings also point to task cohesion being better positioned as an outcome rather than an antecedent within the BNT framework. Current results also indicate that the satisfaction of the need for competence may hold particular importance in influencing the experience of vitality for teams as a whole.

CHAPTER 6

COACH-CREATED ENVIRONMENT, TASK COHESION, BPNS, AND CHANGES IN
POST-TRAINING WELL-BEING IN ELITE RUGBY PLAYERS OVER SEVEN DAYS

Abstract

The present research provided an extension to previous diary studies that have tested BNT (Deci & Ryan, 2000) by examining the degree to which levels and changes in perceptions of the autonomy supportive coach created environment, task cohesion, and basic psychological needs satisfaction were predictive of levels of reported well- and ill-being in elite level team sports players over seven daily training sessions. *Design:* A seven day daily assessment of elite level rugby players' (M age = 18.34; SD = 1.98) perceptions of the variables outlined. Findings point to a mean rate of change in rugby players' perceptions of negative affect over seven days. A model including levels of autonomy support and competence need satisfaction as predictors of these rates of change over time indicated a decrease in levels of negative affect over the first five days and an increase over the weekend. There was no evidence of variance between players reported levels of negative affect at baseline and over time.

The examination of optimal functioning in athletes' has typically been investigated using the basic psychological needs theory (BNT; Ryan & Deci, 2000, 2002). There has been limited research directed towards understanding within-person daily fluctuations (over time) in athletes' basic need satisfaction and their determinants and consequences particularly with regards to elite team sports participants. In the present study we aimed to extend the literature through examining whether perceptions of the coach-created environment (i.e., autonomy supportive coaching), BPNS and task cohesion in training predict individual levels and changes in players' well-being (i.e., vitality) and optimal functioning during training over seven days. Perceptions of negative affect were included as an indicator of ill-being. Furthermore, it was important to examine whether these changes in reported perceptions of the coach-created environment, BPNS, task cohesion and well-being (i.e., vitality) and ill-being (negative affect) vary between the players over the seven day period.

The Social Environment and Basic Needs Theory

It is now well established that a critical factor contributing to athletes' healthy or compromised development and functioning is the social environment that surrounds young athletes when they train and compete (Adie et al, 2012; Duda & Balaguer, 2007). The effect of the social environment perceived by athletes in predicting determinants and consequences of motivational processes in sport has been examined utilizing self-determination theory (SDT; Deci & Ryan, 1985, 2000; Hagger & Chatzisarantis, 2007). More specifically, the extent to which athletes' functioning in sport is optimal or compromised has typically been explored using the basic psychological needs theory (BNT; Ryan & Deci, 2000, 2002). BNT, a mini theory of SDT, assumes that autonomy supportive environments support satisfaction of the basic psychological needs for competence, autonomy, and relatedness. In such environments, satisfaction of the basic needs is associated with athletes' reported autonomous

motivation and well-being. In contrast, more controlling environments are expected to diminish or even thwart basic need satisfaction and result in more maladaptive outcomes (Deci & Ryan, 2000; Bartholomew et al, 2011).

The satisfaction of the need for autonomy is experienced when an individual feels their actions are under their own control and they are provided with choice (de Charms, 1968). When the need for competence is satisfied an individual experiences feelings of being effective and feels in possession of adequate ability to perform (White, 1959). When an individual feels securely connected to and understood by others it is more likely that their need for relatedness will be satisfied (Baumeister & Leary, 1995). Autonomy supportive environments have been linked to satisfaction of the needs which in turn have been associated with positive well-being outcomes in both recreational (Reinboth & Duda, 2006; Reinboth, Duda, & Ntoumanis, 2004) and elite sports participants (Adie, Duda, & Ntoumanis, 2008; Adie et al, 2012). In contrast, psychological need thwarting is described when the psychological needs are prevented or compromised in social environments that are perceived as more controlling (Bartholomew et al, 2011). Low levels of need satisfaction have been negatively correlated with markers of ill-being (Adie et al, 2008) and thwarting of the needs has been related to the experience of ill-being in athletes (Bartholomew et al, 2011; Balaguer, Gonzalez, Fabra, Castillo, Merce & Duda, 2012).

The tenets of BNT in sport and other performance-related settings (i.e., dance) have been well supported in studies adopting cross-sectional and between-persons designs (i.e., examination of differences between players in the hypothesised BNT relationships) (Quested & Duda, 2010; Adie et al, 2008; Reinboth & Duda, 2006). However, in these cross-sectional studies variability in the strength and direction of relationships (i.e., positive and negative) between autonomy supportive coaching environments and the three basic psychological needs

have been revealed (Quested & Duda, 2010; Adie et al, 2008). Overall the literature has provided support for the role of autonomy supportive coaching environments in nurturing a sense of competence in athletes, but the hypothesised positive relationships between autonomy supportive coaching behaviours and the psychological needs for relatedness and autonomy have been less consistent across existent cross-sectional studies (Quested & Duda, 2010; Adie et al, 2008). There have also been discrepancies in the evidence examining the relationships between the three needs and positive and negative affective states (Quested & Duda, 2010; Adie et al, 2008). A suggested reason for the latter findings centered on the importance “need salience” of different BPNs in predicting affective states in specific situations and settings at different times throughout the day i.e., in dance class or performance and training contexts (Quested & Duda, 2013; Adie et al, 2008). The examination of repeated daily perceptions of the social environment and how they impact on athlete well-being will also provide further insight into the strength and direction of relationships between the BNT constructs that cross-sectional research has been unable to address. Thus the investigation of athletes’ daily fluctuations in perceptions of their social environment and the degree to which these variables impact upon athlete well-being and functioning is relevant to understanding the factors which contribute to optimised and sustained psychological health within the sport milieu (Quested et al, 2013a).

In particular, diary studies enable researchers to examine *day-to-day* fluctuations in perceived basic needs satisfaction and thwarting, and experiences of well- and ill-being. That is, study participants are able to report their feelings temporally close to the actual experience and therefore the potential for retrospective bias that typically occur in cross-sectional questionnaire methodologies is reduced (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Bolger, Davis, & Rafaeli, 2003). Furthermore, using a ‘diary’ methodology, daily

observations are usually aggregated for each individual and the means and variance of these observations can be analysed over time providing a more accurate representation of an individual's overall experience.

To date, research adopting a within-person design (i.e., examination of relationships between variables for individual athletes) has found athletes'/dancers' experiences of autonomy support during training and practice sessions to be a significant predictor of daily reported basic need satisfaction (Adie et al, 2012; Quested, Duda, Ntoumanis, & Maxwell, 2013). Changes in positive affect during training have been predicted by need satisfaction experienced during training in athletes and dancers (Bartholomew et al, 2011; Quested et al, 2013). Hancox (2014) also found that basic psychological need thwarting mediated the relationships between social environmental climates perceived as being high in disempowering features (i.e. controlling interpersonal behaviors by the teacher) (Duda, 2013) and vocational dancers' feelings of negative affect pre- and post-dance class.

Diary studies also allow for the assessment of individual athletes' fluctuations in affective states over time thus enabling researchers the capacity to analyse the extent to which an athlete's affective state varies above and below a their typical daily level. The changes in reported positive and negative state are considered an important characteristic of an individual's subjective well-being with greater variability in perceived affective states over time being indicative of maladaptive functioning (Diener, 2000). Existing diary study research with athletes and dancers has revealed that low need satisfaction has been associated with negative affect (Gagne et al, 2003; Quested et al, 2013). To date, research has also indicated that athletes' / dancers' experience of psychological need thwarting was predictive of athletes' experience of negative affect when examined on a daily basis (Bartholomew et al, 2011; Hancox, 2014).

The Role of Team Cohesion Within the Basic Needs Theory

Cross-sectional and between-person studies have established that teams that demonstrate high task and social cohesion have been positively associated with improved sport performance (Carron, Colman, Wheeler, & Stevens, 2002; Carron, Bray, & Eys, 2002), and other positive outcomes for individual athletes such as satisfaction in their sport participation (Blanchard, Amiot, Perreault, & Vallerand, 2009), and improved emotional regulation (Taylor & Bruner, 2013).

In autonomy supportive coach-created team environments it is expected that the players' basic needs are more likely to be satisfied and that satisfaction of the basic needs will lead to greater levels of task and social cohesion. When the basic needs are satisfied, players are likely to experience increased feelings of affiliation and "belongingness" (Baumeister & Leary, 1995), and behave in more cooperative ways towards their teammates and the coach (Brawley, Carron, & Widmeyer, 1988; Heuze, Raimbault et al, 2006). Levels of task cohesion may also be enhanced when players feel competent in their own ability as players and are less likely to be threatened by competition from teammates leading to more cooperative behaviour towards the team.

Studies have revealed that task cohesion was predictive of satisfaction of the three basic needs, and most strongly predicted perceptions of relatedness (Blanchard et al, 2009). However, to date there has been no examination of the extent of influence the levels of task cohesion may have on team players' basic need satisfaction and overall functioning when assessed on a daily basis following training. Researchers exploring group functioning and team cohesion have highlighted the importance of integrating the examination of motivational processes with team cohesion in order to develop a greater understanding of factors that contribute to the overall psychological health and performance of sports teams (Spink, Nickel,

Wilson, & Odnokon, 2005).

Objectives of the Present Study

This study aimed to provide further examination of the tenets of BNT by exploring athletes' daily fluctuations in affective states in junior elite athletes within a team sport setting that involves high levels of interaction between players and coaching staff i.e., rugby union elite academy training squads. Further research is required to understand within-person daily fluctuations (over time) in both athletes' basic need satisfaction and their determinants and consequences particularly with regards to elite team sports participants at a critical stage of their athlete development (i.e., academy group 16-18 years of age). Specifically, in the present study we aimed; i) to examine whether rugby players' perceptions of the coach-created environment (i.e., autonomy supportive coaching), BPNS and task cohesion in training predict mean rates of change in players' well-being and optimal functioning during training (i.e., daily reported training vitality and negative affect) over seven days, and ii) to examine whether these rates of change in reported perceptions of the coach-created environment, BPNS, task cohesion and well-being (i.e., daily reported training vitality) and ill-being (i.e., daily reported training negative affect) vary between the players over seven days.

Method

Participants Two hundred and sixteen (M age = 18.20 years; SD = 2.12) elite male Academy rugby players were recruited during their Regional and National Academy squad training sessions located at twelve different Regional training centres at various locations across Wales. Players had been participating in rugby within their respective squads and with the coach for on average 1.83 seasons (M = 1.83; SD = 1.03). Players trained and competed in

rugby for an average of 8.80 hours per week ($M = 8.80$; $SD = 4.58$). On average the players spent 6.47 hours contact time with their coach each week ($M = 6.47$; $SD = 3.91$).

Procedures Ethical approval to conduct this study was granted by the University Ethics Committee. The performance managers and coaches of the participating Regional and National squads were provided with a presentation explaining the purpose and further details of the study two months prior to commencement of the study. Players were provided with an initial questionnaire and asked to reflect upon their perceptions of the coach-created environment, team cohesion, BPNS, and well- and ill-being over the last 3-4 weeks. Following the initial questionnaire, players were provided with weekly diary booklets designed to assess daily fluctuations in their perceptions and feelings before and after the main rugby training session each day. These pre- and post-training measures were then aggregated to provide an overall score for reported daily observations for the rugby players. This consideration of multiple daily observations and aggregation allows for the minimisation of retrospective bias that is typically evident in cross-sectional surveys. The diary booklets were completed on a daily basis for a period of four weeks in October during a highly intensive training period in the season. Instructions on how to fill in the questionnaire and the daily diary entries were given to the athletes both in written instruction and verbally by a trained researcher. These instructions stated that responses would be kept confidential, that there were no right or wrong answers, and emphasized the importance of personal and honest responses to the questionnaire items. Convenient meeting dates and times were arranged with the team managers and coaches for each squad of players. On average, the initial questionnaire took approximately 30 minutes to complete and the diary entries took approximately 5 minutes each day. Of the 216 players, 52 (24%) returned completed weekly diaries (M age = 18.34; $SD = 1.98$).

Person-level measures

Coach- created Environment A seven-item measure of autonomy supportive coaching was adapted from the Health Climate Questionnaire (Williams, Grow, Freedman, Ryan, 1996; Reinboth & Duda, 2006) to assess the degree to which players perceived that their coaches involved them in decision-making, provided them with meaningful choice, acknowledged their feelings and promoted athletes' overall sense of volition (e.g., "My coach gave players choices and options"). All items were preceded by the instructions "...think about what it has usually been like on this team during the last 3-4 weeks. In my sport ...". Responses were indicated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Previous sport research using this scale has found athletes' scores to be reliable and valid (e.g., Adie et al, 2008).

Basic Psychological Need Satisfaction All items were reworded to reflect the youth sport and rugby environment and preceded by the stem "...think about what it has usually been like on this team during the last 3-4 weeks. In my sport..." All responses were made on a seven-point Likert scale anchored by 1 (*strongly disagree*) to 7 (*strongly agree*) for simplicity and parity (Quested et al, 2013).

Six items from Standage, Duda, and Ntoumanis's (2005) study were utilised to assess players' satisfaction for the need for autonomy. The additional reverse-scored item was not included in the present study ("I had to force myself to play rugby") because.... Players responded to the items (e.g., "I had a say regarding what skills I want to practice"). Support for the reliability, and validity in team sports participants, of a five-item version of this scale has been shown in British university athletes (M age =19.56; SD =1.83) (Reinboth & Duda, 2006).

The five-item perceived ability subscale of the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989) was administered to assess players' satisfaction of the need for competence. Items included phrases such as "I was pretty skilled at my sport." Athletes' scores on the competence subscale of the IMI have demonstrated acceptable reliability and validity with similar aged participants in previous research (Alvarez et al, 2009; Ntoumanis, 2001; Gagne et al, 2003; Reinboth & Duda, 2006).

The need for relatedness was measured by five-items from the Acceptance subscale of the Need for Relatedness Scale (Richer and Vallerand, 1998). The items used to assess perceived relatedness were: supported, understood, listened to, valued, and safe. Items included phrases such as "I felt supported by my coach." The reliability of the scales tapping satisfaction of the need for relatedness to coach has been supported in previous research with athletes (Reinboth & Duda, 2006).

Indicators of Athlete Well- and Ill-being Feelings of vitality/energy were measured by the six-item version of the Subjective Vitality Scale (Ryan & Frederick, 1997). Player responses were indicated on a seven-point Likert scale anchored by 1 (*not at all true*) and 7 (*very true*). Players were asked to reflect upon what it had usually been like on their team over the last 3-4 weeks. The stem "In my sport..." preceded the items (e.g., "I felt alive and vital"). In previous sport research, this scale has been found to be valid and reliable (e.g., Gagne et al, 2003; Reinboth & Duda, 2006; Blanchard et al, 2009).

The negative affect scale (PANAS; Watson et al, 1988) was employed to tap into the rugby players' feelings of negative affect (e.g., afraid) following the stem "...think about what it has usually been like on this team during the last 3-4 weeks. Player responses were indicated on a five-point Likert scale anchored by 1 (*not at all*) and 5 (*extremely*). In my

sport...” The PANAS has demonstrated reliability and validity in previous diary studies (Quested et al, 2013; Gagne et al, 2003).

Perceived Task Cohesion Eight items from the Youth Sport Environment Questionnaire (Eys, Loughhead, Bray & Carron, 2009a) was utilised to assess players’ evaluation of task cohesion within their teams. The measure was specifically designed to assess perceptions of cohesion in members of youth (13-17 years of age) sport groups. The measure contains eight task cohesion items. Following the stem, “...think about what it has usually been like on this team during the last 3-4 weeks. In my sport ...” players were asked indicate their responses on a nine-point Likert scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*) indicative of their perceptions for the team. Items included questions such as “We all shared the same commitment to our team’s goals,” and “I liked the way we worked together as a team”. This questionnaire has demonstrated good psychometric properties (e.g., factor structure and internal reliability of task and social dimensions) (Eys, Loughhead, Bray, & Carron, 2009b). The analyses of social cohesion items were omitted from this study as in alignment with the previous studies in this thesis, the relationships between task cohesion and the basic psychological needs (BPNs) (i.e., BPN satisfaction and thwarting) were stronger than those between social cohesion and the BPNs. In addition, with limited numbers of participants and the complexity of the hypothesised model, omitting social cohesion from the model allowed for a more parsimonious representation of the rugby players’ reported perceptions.

Diary measures

Items were selected from the initial person-level questionnaire to create the diaries. Prior to the main training session for the day players were asked to respond to items tapping into their negative affective states and preceded by the stem “at this moment in time / right

now ... I feel ...” on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*). Previous studies utilizing the shortened version of the PANAS have supported the factorial validity of the scale (MacKinnon et al, 1999). Items examining players’ state levels of subjective vitality, and emotional and physical exhaustion were also administered. Further pre-training items examined players’ perceptions of basic need satisfaction and have been previously administered in diary studies with dancers (Quested et al, 2013). Following the training session, players were again asked to respond to items tapping into feelings of well- and ill-being, and basic need satisfaction. Players’ were also asked to reflect upon perceptions of the coach-created environment and the degree of task cohesion experienced by the team as a whole during the training session recently completed.

Data Analysis

Structural equation modeling (SEM) was employed (using Version 22 of the AMOS software) (Arbuckle, 2007) to systematically test relationships within hypothesized structural models. Latent growth curve modeling (LGCM; Preacher, Wichman, MacCallum, & Briggs, 2008) is one application of SEM that is commonly used to test the change in relationships between predictor and outcome variables with repeated measures over time (Preacher et al, 2008). Values of time (i.e., in this case days) are added to the structural model to assess the hypothesized trajectory of change over time. LGCM enables the analysis of changes for both variable-centered and person-centered perceptions (Preacher et al, 2008). These changes can be estimated for the sample as a whole, but individual differences in change from initial mean values and changes in these mean values over time are also considered (Preacher et al, 2008).

The analysis involved the testing of structural models designed to examine how much rugby players’ daily perceived levels of well-being (i.e., vitality) and ill-being (i.e., negative affect) change from the initial baseline levels across the seven days. The basic LGCM model

includes two latent factors: an intercept and a slope. The baseline models contained one latent factor of mean level (i.e., intercept; an athlete's initial value of BPNS on day one), one latent factor of change (i.e., slope; an individual athlete's trajectory of change in BPNS over seven days), and one dependent categorical factor (i.e., vitality or negative affect). Due to the limited compliance on diary responses over the four week period of data collection, the players' responses over the initial seven days only were used for the analysis.

Once it had been concluded that there was evidence of a mean rate of change in reported well-being and ill-being over time, then potential predictor variables were added into the hypothesized structural model. Estimates of variance in the mean levels of well-being and ill-being between were also assessed alongside whether there was variance between players' change in reported levels over the seven days. Due to the limitations on sample size, the complexity of models were reduced by introducing potential predictors (i.e., BPNS, task cohesion and features of the coach-created environment) of changes in well-being and ill-being one by one and model fit was subsequently assessed. Non-linear effects are detected within the hypothesized model in AMOS through the examination of changes in values of the reported slope co-efficients in the path diagram representing change across time from left to right (i.e., changes in reported values from day 1 to day 7).

Similar to standard SEM, goodness-of-fit indices were used to assess the hypothesised structural relationships applying the recommendations by Hu and Bentler (1999). An adequately fitting model was demonstrated by a non-significant chi-square. The comparative fit index (CFI) was used to assess incremental fit, with values equal to or greater than .95 cut off criterion indicating models with good fit. Values equal to or above .90 are deemed to indicate acceptable model fit (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA) indicated levels of absolute fit (Hu & Bentler, 1999). Models with

RMSEA values close to .06 are considered to indicate good fit to the data (Hu & Bentler, 1999). 90% confidence intervals were used to confirm confidence in the RMSEA values (Hu & Bentler, 1999). Lower confidence interval values near to .00 and upper values of less than .08 are considered acceptable (Cheung & Rensvold, 2002).

Results

A summary of the descriptive statistics, alpha reliability coefficients, and correlations between the variables of this diary study are presented in Table 6.1. Overall the rugby players reported mean daily vitality levels ($M = 3.87$) above mid-point and mean daily levels of negative affect below the midline ($M = 1.68$). The average values of autonomy supportive coach-created environment and satisfaction for the needs of competence ($M = 3.46$) and relatedness to coach ($M = 3.42$) were above mid-point, whereas the need for autonomy was below mid-point ($M = 3.36$). Autonomy was subsequently removed from the analysis due to poor scale reliability ($\alpha < .70$). Mean levels of perceived task cohesion were also relatively low ($M = 4.64$) in comparison to previous studies with hockey players (chapters two, three, and four). There were good levels of reliability with alpha reliability coefficients for all measures were above .70 apart from autonomy need satisfaction ($\alpha = .69$) which did not meet acceptable levels of reliability (Nunnally, 1978). Satisfaction of the need for autonomy was subsequently removed from the analysis.

Testing the mean intercept and slope values for well-being and ill-being

A series of hypothesised structural models assessed the degree to which rugby players' perceived levels of well-being and ill-being changed over time. The mean slope estimates revealed that there were significant changes in reported means for the observed indicator of ill-being (i.e., negative affect) but not for the index of well-being (i.e., vitality) over time (i.e.,

seven days in this study) (see Table 6.2 for mean intercept and slope estimates). This trend demonstrated that there was an overall decrease in negative affect over the initial five days (i.e., Days 1 to 5; $\beta = .00, .21, .20, -.15, .01$) and then an increase over the final two days (i.e., the weekend; Days 6 and 7; $\beta = .50, 1.00$) representing a curvilinear effect. Subsequent analyses of variance in intercept and slope estimates revealed no significant differences between the players' reported negative affect over the seven days. The variance of both the intercept (1.01, $p > .05$) and slope (.03, $p > .05$) were insignificant.

Table 6.1 Descriptive statistics of the daily reported BNT-related variables and task cohesion averaged across seven days

	<i>M</i>	<i>SD</i>	<i>K</i>	<i>S</i>	α	Range	1	2	3	4	5	6
10. Autonomy Support	3.37	.63	1.22	-.74	.81	1-5	-					
11. Task Cohesion	4.64	1.44	-.78	-.13	.89	1-9	.50**	-				
12. Relatedness to Coach	3.42	.82	.78	-.59	.76	1-5	.37**	.24**	-			
13. Competence	3.46	.77	1.25	-.74	.71	1-5	.62**	.38**	.11*	-		
14. Autonomy	3.36	.84	.34	-.59	.69	1-5	.36**	.46**	.42**	.14*	-	
15. Vitality	3.87	1.30	-.49	-.11	.88	1-7	.24**	.52**	.29**	.44**	.07	-
16. Negative Affect	1.68	.76	-.64	.85	.85	1-5	-.39**	-.21**	-.10*	-.08	.08	-.36**

¹ NB. * p < .01, ** p < .001

Table 6.2 Initial level (intercept) and rate of change (slope) estimates for well- and ill-being variables

Well-being/ Ill-being Criterion	<i>Intercept</i>	<i>Slope</i>
Vitality	3.95**	-.04
Negative Affect	1.55**	.20**

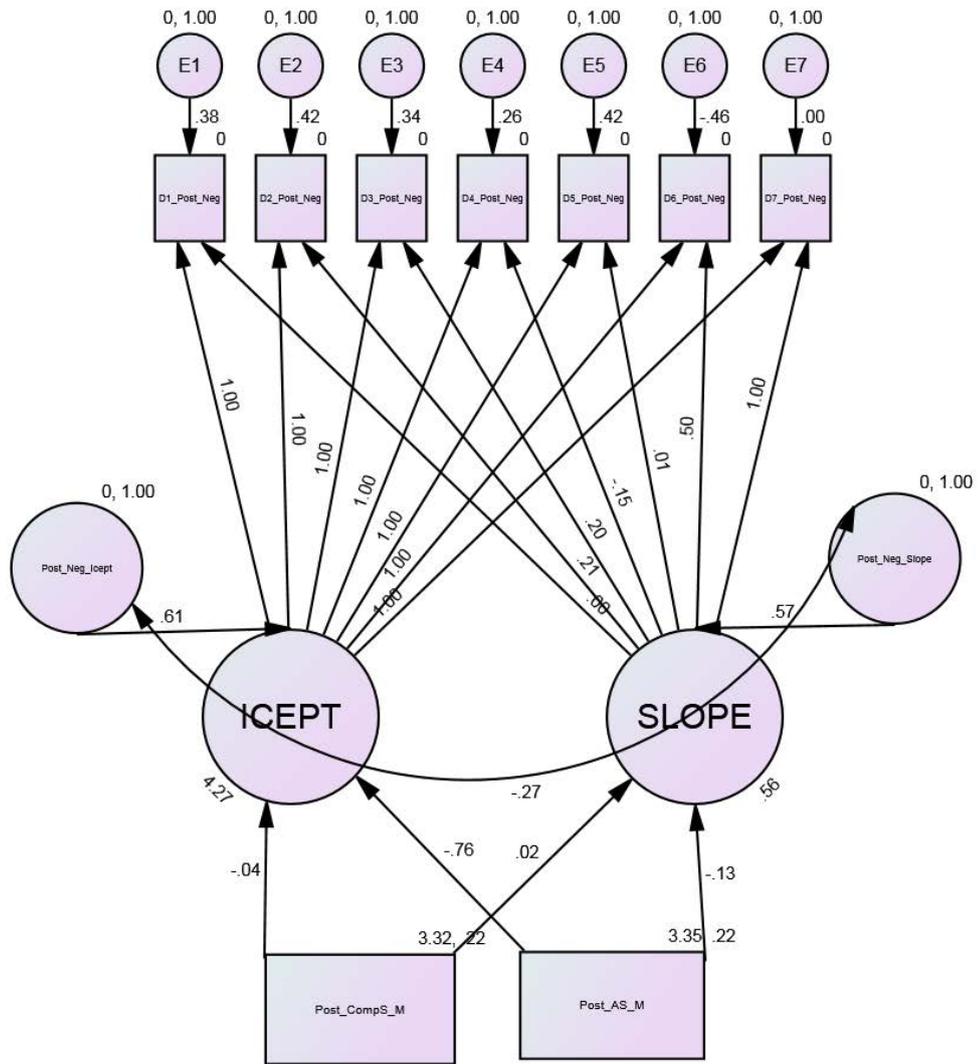
¹ NB. * p < .01, ** p < .001

Table 6.3 Regression of initial level (intercept) and rate of change (slope) in players' feelings of negative affect on predictor variables

Predictor	<i>Intercept</i>	<i>Slope</i>
1. Competence Need Satisfaction	-.04*(.24)	.02(.22)
2. Autonomy Support	-.76**(.22)	-.13*(.22)

NB. Standard error in parentheses. * p < .01, ** p < .001

Figure 6.1 Path analysis of intercept and slope variables repeated measures over seven days



NB. * $p < .01$, ** $p < .001$

Testing the hypothesised associations between predictor variables and well-being and ill-being

Once it had been established that there were differences in the mean intercept and slope values for reported daily ill-being (i.e., negative affect), the next step was to introduce potential predictors of feelings of negative affect into the structural model. Due to the limitations of sample size relative to the overall number of parameters, potential predictors (i.e., autonomy support, competence, relatedness to coach, and task cohesion) were added to the hypothesised model separately and the associations with each of the daily training indices of negative affect were tested. Following the testing of a series of models, findings revealed that a model including the independent variables competence need satisfaction and autonomy supportive coaching provided the best fitting model. Autonomy supportive coaching in particular was negatively associated with daily reported levels of negative affect at baseline and over time (Figure 6.1). Competence need satisfaction was also negatively associated with negative affect at baseline but this association was not evident over time. The average change in reported daily levels of negative affect was significant (i.e., associated with an average reduction in levels of negative affect over the first five days and an increase over the weekend) over seven days (Table 6.3) with fit indices indicating a model with adequate to good fit to the data [$X^2 = 45.43$ (29); CFI = .95; TLI = .92; RMSEA = .05 (.01-.07)].

Discussion

This study aimed to provide further examination of the tenets of BNT by exploring athletes' daily fluctuations in affective states of athletes within rugby union elite training squads. More specifically, in the present study we aimed; i) to examine whether rugby players' perceptions of the coach-created environment (i.e., autonomy supportive coaching), BPNS and task cohesion in training predict mean rates of changes in indicators of players' well-being and ill-being experienced during training (i.e., daily vitality and negative affect) over seven days, and ii) to examine whether these rates of change in reported perceptions of the coach-created environment, BPNS, task cohesion and well-being (i.e., daily vitality and negative affect) vary between the players over seven days. The theoretically hypothesised mediating role of the BPNS in regard to the social environment and affective outcome/indices of functioning relationship was not considered in this study.

Testing the associations between predictor variables and well-being and ill-being

The assessment of parameter estimates for mean intercept and slope revealed that there was a mean rate of change in players' reported daily training values of negative affect over the seven days but this change was not apparent for vitality. A model including the predictors of autonomy supportive coaching and competence need satisfaction demonstrated the best fit. Overall, changes in feelings of negative affect indicated a trend for decreased levels of negative affect over the first five days and then an increase over days six and seven (i.e., the weekend). Players' perceptions of autonomy supportive coaching were found to be negatively associated with a mean rate of change in players' feelings of negative affect over the seven days. These associations between autonomy supportive coaching with feelings of negative affect are inconsistent with previous diary studies examining daily fluctuations of perceived ill-being in vocational dancers (Quested et al, 2013). Although Quested and

colleagues discovered mean rates of change in positive affect and situational differences (i.e., across classes, rehearsals, and performances), they did not find any significant interactions with negative affect over time.

Previous cross-sectional studies in this thesis have shown autonomy supportive environments and competence need satisfaction to be negatively associated with reported feelings of ill-being (i.e., physical and emotional exhaustion; chapters Three and Four). However, the repeated measurement of these relationships over seven days in this study indicates that there are daily fluctuations over the course of a training week. These negative associations between an autonomy supportive environment and negative affect are not consistent with previous diary studies examining daily fluctuations of perceived ill-being in vocational dancers (Quested et al, 2013). With regards to the general trend in perceived negative affect, it is possible that overall this sample of rugby players felt more comfortable in their training sessions during the week when perhaps the coaching environment is more autonomy supportive and their skills and abilities at rugby are nurtured. The sharp increase in levels of negative affect observed at the weekend may be due a number of reasons that cannot be fully explained from the findings of this study. One possible reason may be due associated with the fact that the weekend is typically marked by competitive matches. This switch from training to a more competitive environment may lead to changes in coach interactions becoming more controlling (i.e., characterised by intimidation, or conditional reward or regard during training) with players and the experience of greater anxiety during match days resulting in heightened feelings of negative affect (i.e., nervous, scared). The roles of competence need satisfaction and autonomy support may act as a buffer to attenuate feelings of negative affect in this specific sample of rugby players. Rather than autonomy support and competence being linked to enhanced feelings of vitality in the players (Reinboth & Duda,

2006; Adie et al, 2008), it appears that the training environment helped to reduce feelings of negative affect during training with levels of reported ill-being increasing again during the weekend competition.

With regards to the lack of evidence for mean daily rates of change in reported vitality over seven days, it is possible that vitality as an important indicator of eudaimonic well-being may be less sensitive to daily fluctuations as opposed to more hedonic well-being indicators such as affective responses that have demonstrated fluctuations in previous diary studies (Quested et al, 2013). It is possible that the academy rugby players were experiencing general heightened levels of negative affect (i.e., nervousness) that were more sensitive to daily change in comparison to the reported levels of personal energy over time. These increased feelings of negative affect may have been due to the data collection taken place during the selection phase of the season (including training and competitive activities) where the 'stakes are high' in regard to securing squad places.

The observed mean levels of task cohesion were low in the current study compared to the hockey player samples examined in the earlier chapters of this thesis (i.e., chapters Three, Four, and Five). Moreover unexpectedly weak associations between BPNS and well- and ill-being outcomes emerged. It is possible that at this early stage of the season (i.e., following one month of training and competition), the relationships between players and coaching staff may not have had enough time to fully develop.

Limitations

Findings from this study should be viewed with some caution due to the limited compliance of rugby players towards the completing of the diaries and reduced numbers that could be examined within the hypothesized structural model i.e., numbers were reduced from $n = 216$ completing the initial person level items to $n = 52$ during the diary phase of the study.

In addition, it is possible that asking participants prior to the study to complete four weeks of daily diary entries will have negatively influenced their compliance during the opening couple of weeks of the study. It may have been a more successful approach to aim for two weeks with this sample of players or to assess compliance on a week to week basis. Unlike previous studies with vocational dancers where participants were located at one venue (Quested et al, 2013), the rugby players in this study were located across twelve different academy centres and required to complete their diary entries before and after the main training session or competition each day. Ideally it would have been beneficial for a researcher to be in attendance during data collections before and after each training session at each academy centre to provide extra encouragement and to ensure that the players completed their diary entries correctly. It is likely that this would have resulted in greater compliance over time.

With a limited sample size, it is difficult to examine models with multiple predictors and with the complexity required to adequately test BNT associations with repeated assessments. Growth models have been fitted successfully with samples as small as $n = 22$, but sample sizes of at least $n = 100$ are typically preferred and this is also dependent on the complexity of the model being tested (Curran, Obeidat, & Losardo, 2010). As a consequence only the predictor variables with the strongest paths for intercept and slope were entered into the final structural model.

Although measures for controlling coach behaviours, social cohesion, positive affect, and physical and emotional exhaustion were also included in the initial questionnaires and diaries, when entered into the structural model the associations between these variables and intercept /slope variables were poor. In addition, items capturing basic psychological needs thwarting were also included in the players' daily diaries, but similar to the items assessing autonomy need satisfaction, these items revealed poor reliability and were subsequently

removed from the analysis. In future studies, with sufficient numbers of participants (i.e., $n > 100$) it would be beneficial to have positive and negative aspects of the coach-created environment including in the analyses. Coming from a SDT perspective (Deci & Ryan, 1985; 2000), coaching behaviours can be distinguished in terms of both autonomy supportive and controlling features and they do not represent ends of a bipolar continuum. Both BPNS and BPNT should also be included in the hypothesised structural model with indicators for well-being and ill-being as outcomes (Duda, 2013; Appleton & Duda, 2016).

Future Directions

Future analyses require a larger sample size allowing for the examination of a more complex structural model incorporating within-person and between-person changes in team sport athletes' perceptions of the coach-created environment, task cohesion and BPNS, and how this impacts upon well- and ill-being over time. Even larger samples including whole teams (i.e., ideally forty teams or more) of players would enable the analysis of within-team (i.e., testing for differences between players within teams both at baseline and over time) and between-teams (i.e., are there consistent differences in the BNT-related associations between teams and are there consistent patterns of changes in these associations between variables over time?) effects. The application of multi-level modelling statistical approaches would enable an examination of the potential influence of each of the predictors (i.e., multiple predictor variables) on BPNS and indices of well- and ill-being. Such an analytic approach would allow for the testing of the three basic psychological needs as potential mediators in the relationships between the coach-created environment and well- and ill-being outcomes.

It would also be beneficial to examine fluctuations in daily reported perceptions of the BNT-related variables over a longer period than seven days and preferably up to four weeks. This would provide a better understanding of the mean rates of change and any differences

that may be evident between individual players at baseline and across time. Collecting at different stages of the season may also highlight differing patterns in daily fluctuations within and between players over time. Based on the findings from this study and from previous research examining situational differences in and the salience of each of the basic psychological needs as a predictor of affective states (i.e., across classes, rehearsals, and performance in vocational dancers), it would be advantageous to test for differences in players' reported affective states during training days compared to competition days (Quested et al, 2013).

CHAPTER 7

GENERAL DISCUSSION

Grounded in BNT (Deci & Ryan, 2000) it is well established that the coach-created environment and BPNS are fundamental contributors to variability in the overall functioning and experience of well-being for young athletes and in studies of young people involved in recreational through performance focused activities (Quested et al, 2013b; Stebbings et al, 2011). There is also substantial support for the role of characteristics related to group dynamics, such as team cohesion, as a key predictor of team functioning and performance (Carron et al, 2002). The empirical chapters in this thesis aimed to extend the existing literature by providing a systematic examination of the BNT (Deci & Ryan, 2000) assumed processes that hold implications for the functioning and welfare of, in particular, athletes who train and compete within teams. This thesis also examines these processes through the conceptualisation and testing of teams as a reference group and/or 'unit' on its own. Working towards an integration of key theories and concepts within the motivation and optimal functioning (i.e., BNT; Deci & Ryan, 2000) and group dynamics (i.e., team cohesion; Carron et al, 2005) literatures, the present work aimed to realise a more extended examination of the determinants and indicators of psychological well- and ill-being in the case of teams/team sports athletes. The majority of data contributing to the empirical chapters herein were collected from youth elite athletes. With the increasing physical and psychological demands placed on developing elite athletes, further insight into the social environmental factors and processes relevant to optimal or compromised functioning seem particularly pertinent (Taylor & Bruner, 2012; Morgan et al, 2013).

Chapter Three

Chapter Three provides support for the role of task and social cohesion when examined as both antecedents and outcomes of BPNS, albeit a model positioning task and social cohesion as outcomes provided a better fit. Testing for hypothesized BNT (Deci & Ryan,

1985; 2000) associations in elite and non-elite hockey playing samples revealed invariance in the relationships across competitive levels thus supporting the universality hypothesis proposed by Deci and Ryan (2000).

Chapter Four

In Chapter Four, a novel approach to testing the BNT process model (Deci & Ryan, 1985; 2000) in regard to team sport participant was considered. This study involved the conceptualisation and examination of BNT when all variables were referenced with respect to the team as a whole (in the views of individual athletes on that team). For the purpose of this thesis, this study provided support for BNT as tested via this alternative method for assessing basic psychological need satisfaction, and indicators of the psychological well-being for teams as a whole. This study also provided a precursor to potential future studies beyond this thesis where both self-referenced and team-referenced approaches could be compared as methods of testing the BNT-related associations (and including basic psychological needs thwarting) when applied to teams.

Chapter Five

Chapter Five extends past work on the BNT process model (Deci & Ryan, 1985; 2000) using a multilevel structural equation modeling (MSEM) approach that enables the analysis of separate effects within- and between-teams. The study presented in chapter five also examined the role of task cohesion as both an antecedent and as an outcome. The findings highlighted the differing roles that each of the basic psychological needs may have for athletes participating within teams and for teams. Satisfaction of the need for competence was found to hold particular importance when examined between teams. Findings revealed

that task cohesion was better positioned as an outcome rather than an antecedent within the BNT-related sequence.

Chapter Six

Chapter Six built upon the previous cross-sectional studies in this thesis through the examination of the BNT process model (Deci & Ryan, 1985; 2000) by application of a diary study approach to assessment of key variables which were secured over a period of seven days. Findings provided evidence of mean rates of change in reported negative affect over time to be predicted via changes in reported autonomy supportive environment during training for elite rugby players. Although competence need satisfaction was negatively associated with negative affect at baseline, this relationship was not evident in reported mean rates of change in negative affect over time. It is possible that more autonomy supportive environments act as a buffer to feelings of negative affect.

This final chapter draws together the key findings from the empirical studies comprising this thesis and discusses how the methodological approaches taken within and findings of these studies extend the sport and exercise psychology literature pertaining to optimal functioning in team sports. The final sections of this Discussion chapter provide a summary of the general limitations to the studies comprising this thesis, directions for future research, and the practical implications of this work.

The Positioning of Task and Social Cohesion Within the BNT Framework

Overall the combined evidence from Chapters Three and Five indicates that perceptions of task cohesion may be better positioned as an outcome variable (i.e., indicators of optimal functioning and well-being) rather than an antecedent variable (i.e., features of the social environment) in the process model. Although findings in Chapter Three provide some

indication that task and social cohesion may also be appropriately positioned as an antecedent, overall our findings in Chapters Three and Five point to task cohesion being more effectively positioned as an outcome. In contrast, previous research by Blanchard and colleagues (2009) found task cohesion to be effectively positioned as a predictor of basic psychological needs satisfaction (BPNS). However, they did not test task cohesion as an outcome of basic psychological needs satisfaction (BPNS) in their study with basketball players.

In Chapter Three the paths between BPNS and social cohesion as an outcome were also much lower in comparison to the associations revealed when task cohesion was positioned as an outcome. Withdrawing social cohesion from the analysis reduced the complexity of the hypothesised models tested in the subsequent chapters in the thesis. Simplifying the complexity of the model by including task cohesion alone, and by taking into consideration the limited numbers in the samples of players relative to the number of scale items, the BNT-related associations could be appropriately tested. Thus, focusing solely on task cohesion as the main dimension of team cohesion in both chapters Three and Five, the testing of the data fit to the hypothesised models provided evidence of the predictive effects of basic psychological needs satisfaction (BPNS) on task cohesion when these relationships were examined within-teams. That is, when individual players perceived that their basic psychological needs were being satisfied, they were more likely to perceive higher levels of task cohesion for the team. However, there was no evidence of these associations when the effects were analysed at between level in Chapter Five. This finding indicates that the associations between satisfaction of the basic psychological needs (BPNs) and perceived task cohesion were not similar enough between members of the same team to be distinct between different teams.

Consistent with existing literature where BNT has been tested at an individual level for

players within teams, we would expect that coaching environments that foster athletes' feelings of competence, autonomy, and relatedness are likely to lead to individuals working cooperatively with their teammates in team related tasks (Heuze et al, 2006). That is, when team sport players feel that they are capable of meeting the individual demands of the task, and they feel that their opinions are being respected and listened to this will lead to a perception of being valued as a member of the team. As a result, individual team members will be more motivated to work together with teammates to achieve the collective task.

The main body of research within this thesis is cross-sectional in design with most of the data collections having been administered during the team selection phase early in the competitive season for both the hockey and rugby teams. Later on in the season, when social and task-related relationships will have had more time to develop in training and competition, we would expect that a greater sense of "sharedness" would be evident between players and this would be reflected in levels of task cohesion. This perceived "sharedness" between players of the same team could have either positive or negative consequences on levels of task cohesion depending on the extent to which individuals feel that they feel a sense of belonging in regards to task related team activities. Satisfaction of the needs for autonomy, relatedness and competence are also likely to be important for increasing these perceived feelings of togetherness and the enhanced desire to work cooperatively with other teammates that will be reflected in higher perceived levels of task cohesion.

The selection period is likely to be when players need to feel more competent in their ability and realise their desire to make or remain on the team or squad. At this early stage, and similar to team cohesion, players' perceptions of satisfaction of the needs for autonomy and relatedness may not have had time to develop with players having had limited contact time with the coach and their peers. Later on in the season when social and task-related

relationships will have had more time to develop, it is possible that the reciprocal relationships (and direction of the relationships) between task cohesion and BPNS may change. For example, research has revealed that the reciprocal associations (and the direction of these relationships) between perceptions of collective efficacy and task cohesion fluctuate over time as a consequence of what is most salient for the team members at a particular time or stage in the season (Heuze et al, 2006).

Although the strength of the relationships between social cohesion and the basic psychological needs was less than that for task cohesion within this thesis, it is possible that perceived social cohesion may take much longer to develop compared to task cohesion. This may particularly be the case in elite teams during the early stages of development when the majority of contact time between players will be focused on activities in training. Social cohesion may develop over time when players have spent more time with each other away from training and in “downtime” outside of training e.g., social connections may be developed over weekend and weekly training periods where players have more opportunity to interact socially. It is probable that both task and social cohesion play important roles in supporting satisfaction of the three basic needs at different stages in a competitive season. Carron and colleagues’ seminal work investigating the social and task dimensions of team cohesion would seem to suggest that both cohesion dimensions may have important but differing roles to play during the course of a season. The research of Carron and associates indicates that it is important to consider the length of time team or squad members have been training and competing together (Carron et al, 2005). During the selection phase individuals within a team are competing against each other for their place in the team. As the season progresses, players tend to work together with other teammates and against other teams and in such circumstances there is a greater likelihood of social bonds forming between players

leading to social cohesion in the latter stages of the season. The literature has consistently revealed strong associations between task cohesion and constructs capturing feelings of competence i.e., self- and collective efficacy and self-confidence (Feltz & Lirgg, 1998; Heuze et al, 2006; Machida et al, 2012). In addition, the associations between task cohesion and collective efficacy have been found to be predictive of performance in elite teams (Heuze et al, 2006). More research is needed on how social cohesion may contribute to basic psychological needs satisfaction (BPNS) within team sports (and vice versa) moving beyond the adoption of a cross-sectional design.

The mediating role of BPNS

According to BNT (Deci & Ryan, 2000), the role of the basic psychological needs for autonomy, competence, and relatedness are considered to mediate the relationships between the social environment and the extent to which individuals experience well-being/ill-being and are functioning optimally (Ryan & Deci, 2000, 2002). Overall findings from Chapters Four and Five support the role of BPNS in mediating the interplay between the coach-created environment and well- and ill-being outcomes in the case of individual athletes within teams. Findings were stronger regarding the mediating effects of the needs for competence in particular and there was some evidence of the mediating role of relatedness to coach in Chapter Four. In Chapter Four these relationships between autonomy supportive coaching environments and BPNS were evident when the basic psychological needs and vitality were referenced for teams as a whole and when analysed at the individual level for players within teams. In Chapter Five the mediating role of the need for competence was supported between-teams.

These results are consonant with past work testing BNT (Deci & Ryan, 1985; 2000) in elite and recreational youth sports participants that generally supports the role of the three

BPNS as mediators in the BNT process model when analysed at the individual level and referenced to the individual athlete's perceptions and feelings (Adie et al, 2008; Reinboth & Duda, 2006). In Chapter Five, it was noted that there is a dearth of evidence in the sport and exercise psychological literature supporting the mediating effects of BPNS when examined both between teams and within teams. In an extension to the literature, this chapter adopted a MSEM analytic approach that enabled the separation between-team effects and within-team effects (Preacher et al, 2010). Mediation analyses between-teams uncovered that satisfaction of the need for competence mediated the relationships between an autonomy supportive coach-created environment and vitality across two models. This key finding provides further support for the important role of competence need satisfaction as a determinant of well-being and optimal functioning for athletes within teams and suggests that these relationships hold when we examine teams as a whole (Balaguer et al, 2012; Machida et al, 2012). These two models (i.e., Models 1 and 2) also explored the role of task cohesion as an antecedent and an outcome whilst testing the mediating role of the BPNS. The resulting effects revealed no evidence of mediation in the examined relationships, with task cohesion considered as either an antecedent or as an outcome of BPNS. Thus, this study highlighted that there may be differing processes operating for individuals within teams compared to effects occurring between distinct teams where players are exposed to the same social environment, and these differing effects were most notable with regards to satisfaction of the need for competence.

Findings from chapters Four and Five indicate some support for the mediating role of the need for relatedness, but there is less support for the hypothesised mediating role of the need for autonomy within this thesis. There are also discrepancies in the BNT-related literature regarding the mediating role of autonomy (Reinboth & Duda, 2006; Adie et al, 2008). Across all studies in this thesis, satisfaction of the need for autonomy has revealed

relatively weak links with both dimensions of the coach-created environment targeted (i.e., autonomy supportive and controlling features) and the well- and ill-being outcomes assessed. This likely to be due to issues with the items selected to measure satisfaction of the need for autonomy. The original scale was taken from Reinboth and Duda (2006) and intended to capture all aspects of autonomy via the ten items employed. Six of these were used to assess the choice /decision making/input aspects of autonomy i.e., “I feel I can give a lot of input in deciding how the practice / training is being carried out” (Ntoumanis, 2001). They also included four items that tapped into the internal perceived locus of control dimension of autonomy i.e., “In football, I feel that my choices and actions are based on my true interests and values”. Throughout this thesis, studies have adopted a shortened version of this scale including mainly choice / decision making aspect of autonomy neglecting the fully address perceived locus of control. Besides the findings from the studies in this thesis and as noted above, past research has revealed discrepancies in support for the need for autonomy as a mediator of the relationship between social environment and well-being (Reinboth & Duda, 2006, Adie et al, 2008). Again, this may be a function of the need to develop and test new measures of autonomy that more comprehensively assess the construct across different domains. In addition, similar to the needs for competence and relatedness, the specific role of autonomy as a mediator needs to be unravelled with the application of longitudinal studies over a sufficient time frame.

Considering the evidence from this thesis, it is clear that satisfaction of the need for competence holds importance for individuals within teams and also for teams as a whole. As indicated in Chapter Five, recent research involving the simultaneous analysis of self-efficacy and collective efficacy revealed differing roles that self-efficacy (i.e., moderator) and collective efficacy (i.e., mediator) play in the relationships between athletes’ perceptions of

the coach-created environment and athletes' satisfaction with their sports performance (Blecharz et al, 2014). Similarly, differing moderating (i.e., the impact of the associations between the BNT-related variables and the degree to which one variable predicts another) and mediating (i.e., variables that significantly account for the variation in feelings of well- or ill-being) processes may be operating within- and between-teams and relevant to their overall functioning. The simultaneous assessment and separation of within- and between-teams effects using an MSEM approach and considering both moderation and mediation, would provide further insight into the specific roles of each of the basic psychological needs (BPNs). This analysis would involve examining the potential multiple levels of influence and what factors impact that influence (Ntoumanis & Appleton, 2015).

How best do we examine optimal functioning in teams?

In Chapter Four the concept of interdependence was introduced (Johnson & Johnson, 2005) and defined as the “degree and manner in which group members rely on one another and require reciprocal interaction” (Evans et al, 2014, p.514). In team sports where perceptions of the coach-created environment and team cohesion are “shared”, it is possible that these shared experiences of players within the same team may also be manifested in relation to realised need satisfaction and well-being and ill-being within team sport settings (Karreman et al, 2009). The sensation of shared feelings may influence a player's own feelings giving rise to emotional contagion and potentially leading to a “ripple effect” throughout the team (Barsade, 2002; Totterdell, 2000; Campo et al, 2012). However, research on how best to capture BPNS and well- and ill-being (and optimal functioning specifically) when applied to teams (not just individual athletes and what they are thinking and feeling about their own state within a team setting), is yet to be fully explored in the BNT, sport psychology or the group dynamics literatures.

The findings from this thesis provide an impetus for future research based on the BNT framework (Deci & Ryan, 1985; 2000) and centred on the experiences of athletes participating within teams and of teams as a collective entity. Overall the team-referenced assessment approach taken in Chapter Four revealed that the tenets of BNT hold when assessing BNT process model constructs. Building on these findings, future research would be well directed towards testing feelings of basic psychological needs satisfaction (BPNS) as well as basic psychological needs thwarting (BPNT) and well-being/ill-being when perceived for the team as a whole (i.e., team-referenced) and then aggregated to reflect the experiences of players within different teams. This approach is similar to that taken in studies focused on other group dynamics constructs such as collective efficacy (Feltz & Lirgg, 1998). An appropriate and interesting next step would be to compare this team-referenced approach with the aggregation of self-referenced perceptions from the same sample of team athletes in regard to indicators of team functioning including performance. Examination of two models using the alternative approaches and applying multilevel structural equation modeling (MSEM) would help to unravel how best to capture these variables when examined at a team level or provide us with insight on what these two approaches might differentially capture.

General Limitations and Future Directions

Although chapters Three and Five provide evidence for the consideration of dimensions of team cohesion as an outcome in the BNT process model, these findings are limited as they stem from cross-sectional data. Chapter Six outlines attempts to examine the predictive influence of task cohesion on indicators of well-being (i.e., subjective vitality) and ill-being (i.e., negative affect) over a period of seven days. The observed associations between task cohesion and changes in rugby players' feelings of well- and ill-being were not significant when analysed over a limited time frame. Longitudinal study designs involving a longer time

period (i.e., ideally one to two seasons) (Gonzalez, Garcia-Merita, Castillo, & Balaguer, 2016) and adopting a two-wave (Lonsdale & Hodge, 2011) or three-wave cross-lag panel design (Curran et al, 2016) will enable testing of the potential reciprocal effects (and the direction of relationships) that may be occurring between task and social cohesion with all three of the basic psychological needs over time.

In addition to the theoretically predicted (Amorose & Anderson-Butcher, 2007) and empirically supported benefits of autonomy supportive coaching, controlling features of the coach-created environment have been associated with compromised BPNS and with the active thwarting of the BPNs (Balaguer et al, 2012; Bartholomew et al, 2011). To date, research examining controlling coach behaviours and basic psychological needs thwarting (BPNT) has received limited attention (Bartholomew et al, 2011). The simultaneous assessment of autonomy supportive and controlling features of the coach-created environment as well as tests of the satisfaction and thwarting of the basic psychological needs would provide a more thorough examination of the processes leading to positive and negative engagement in team sports (Smith et al, 2013; Duda, 2013; Appleton & Duda, 2016). In this regard, it is important to incorporate indicators of both well-being and ill-being in athletes and in regard to their teams per se to provide better insight into the adaptive and maladaptive consequences of basic psychological needs satisfaction and basic psychological needs thwarting within team sport settings (Smith et al, 2013). In addition to autonomy support, interpersonal interaction and the appropriate structuring of training sessions have been identified as important determinants of need support (Reinboth & Duda, 2006; Taylor & Ntoumanis, 2007). Duda's (2013) multi-dimensional conceptualisation of the motivational climate also highlighted the importance of integrating both SDT (Deci & Ryan, 1985) and AGT (Ames, 1992) when exploring determinants and consequences of 'empowering' and

‘disempowering climates’. It would be interesting to apply her conceptualisation to the examination of empowering coaching climates in the case of sport teams.

Although controlling coach behaviours, basic psychological needs thwarting (BPNT), and a range of ill-being indicators were assessed in the present thesis, a major limitation was the limited number of players relative to the number of parameters observed. Sufficient numbers are necessary for adequately and appropriately testing complex models (Marsh et al, 2012). This resulted in the omission of potential predictors (i.e., notably controlling coach behaviours, social cohesion, and BPNT) and outcome variables (i.e., social cohesion) and the inclusion of only better fitting constructs (i.e., autonomy supportive coaching, task cohesion, and vitality) when testing the hypothesized models. In order to effectively implement longitudinal studies that examine processes at multiple levels (i.e., within- and between-teams and across time points) and involving a broader spectrum of predictor and outcome variables (i.e., the “lighter” and “darker” sides of psychological functioning), it is necessary to have sample numbers of individuals and teams to enable the analysis of complex models.

Finally, the studies in this thesis provide support for the role of team cohesion as both an antecedent and an outcome in the BNT sequence. Future studies would be well directed towards examining the specific roles of both task and social cohesion and how these dimensions interact with BPNS over a sufficient time frame (i.e., one to two seasons). This time period would need to be long enough to allow these dimensions of team functioning to develop adequately, particularly in elite age group teams that often have a change in recruitment of players from year to year. Additionally, it would be interesting to examine the role of task and social cohesion as mediators in the paths between the social environment and prior to BPNS and also following BPNS with well- and ill-being outcomes. For example, further examination of the positioning of the team cohesion constructs may provide a better

explanation of possibilities discussed earlier. That is, when players feel that their interactions with their social environment are predominantly autonomy supportive, they will be more likely to work collaboratively at a group. This may in turn lead to a greater degree of BPNS for individual players and potentially for the team as a whole. Alternatively, it is also possible that when players feel that their BPNs are being satisfied, they will be more likely to work collaboratively as a team resulting in enhanced feelings of well-being.

Practical Implications

The key findings from this thesis provide important considerations regarding the implications of behaviours adopted by coaches that are involved in the development of youth elite level team athletes in particular. Autonomy supportive coaching behaviours (characterised by maintaining players' involvement in decision-making during training and providing meaningful choice with regards to team activities) and task cohesion were linked to basic psychological needs satisfaction (BPNS) and feelings of vitality for hockey players in training and competition (chapters Three and Five).

Team-building has been defined within the organisational psychology literature as a method for supporting the development of group effectiveness, satisfying the needs of group members, and to improve the overall working conditions for the group (Brawley & Paskevich, 1997). With regards to the application of team-building in sport, interventions have typically implemented strategies that aim to improve goal-setting, problem-solving, interpersonal relationships (including team cohesion), and role development (Bruner et al, 2013). Strategies that aim to enhance team cohesion, such as team building and communication activities are fundamental for the fostering of healthy team environments that support sustainable participation but also contribute to the optimal functioning (and potentially improved performance) for young athletes within teams (Bruner et al, 2013).

In addition, it is clear from the evidence provided in this thesis that the adoption of more autonomy supportive coaching behaviours also holds implications for the optimal functioning of teams as a whole. Increasingly there are examples across educational (e.g., in schools; Reeve, 2013) and sports settings (Balaguer et al, 2012; Gonzalez et al, 2016) of interventional work designed to enhance the autonomy supportive features of the social environment. Studies involving the education of coaches in the development of more empowering and less disempowering behaviours (Duda, 2013; Duda & Appleton, 2016), and coach observation (Smith et al, 2013) have revealed that autonomy supportive features are just one important part of the coach-created environment. Interpersonal involvement and the appropriate use of structure in training have also been identified as important determinants of need support that require further examination alongside autonomy supportive features of the coach-created environment (Reinboth & Duda, 2006; Taylor & Ntoumanis, 2007).

Conclusion

The overarching aim of this thesis was to extend the existing literature pertaining to the understanding of the BNT-related processes that are operating when optimal functioning is examined for individual athletes training and competing within teams. This thesis entailed the consideration of both individual players operating within teams and teams as whole units. This involved the examination of the BNT framework when athletes perceived the coaching environment and basic psychological needs satisfaction for the team (i.e., team-referenced). A multilevel approach to the analysis of responses of individuals who are in teams also revealed that there can be team effects evident particularly with regards to the perceptions of autonomy supportive coaching, and associations with competence needs satisfaction and the experience of vitality. The body of work focused on these processes within developing elite athletes and teams providing further understanding of factors that contribute to optimal or

compromised functioning in this specific population. Furthermore, the integration of team cohesion within the BNT process model provided a more comprehensive evaluation of potential determinants of psychological well-being (and ill-being) by considering the role that task cohesion in particular plays in the overall functioning of teams. The invariance of these associations between the BNT-related variables was supported across team sports athletes and different competitive levels (i.e., elite and non-elite athletes).

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APPENDICES

Appendix 1: Studies 1, 2 and 3 (Chapters 2, 3 and 4) Materials

Questionnaires;

- i. Administered to elite junior hockey teams
- ii. Administered to non-elite hockey teams

Appendix 2: Study 4 (Chapter 5) Materials

- i. Questionnaire measures
- ii. Diary measures

Appendix 1

INSTRUCTIONS

- Please answer all the questions as honestly and carefully as possible.
- There are no right or wrong answers so please answer as you truly feel.
- If anything is confusing, please ask for help and the researcher will assist you.
- All questions refer to *your team, your coach, or to you* specifically.

**** ID Number:

Enter your birthday here: ____/____/____

For example, if your birthday is 17th August 1998, please write: **17 / August / 1998**

How many brothers and sisters do you have in total? _____

What is the name of your team? _____

What is the name of your coach? _____

Information about you

Age: ____ Years ____ Months **Gender:** Female Male

What is your postcode (this is usually a six or seven digit code that is the last line of your home address, e.g., B15 2TT? If you do not know it, please write the name of your street and town)

What is your main/major sport? _____

What level do you play (check highest level)?

Recreational Club County Regional National International/Professional

How many years / seasons have you played on this team (played within this squad)? ____ years / seasons.

On average, how many hours per week do you train and compete on this team during the season?
Approximately ____ hours per week.

On average, how many hours per week do you spend (training/involved in competitions) with your coach? Approximately ____ hours per week.

Section A: Please think about **how it typically has felt to play on the team you named above during this season**. What is it usually like on that team?

Please make sure you read the item in the middle, and then respond as you truly feel about how your coach treated *you* this season (left side) and then how you feel the coach treated your *team-mates/team as a whole* (right side).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
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1	2	3	4	5
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On this side, please respond to each statement thinking about how your coach typically treated <u>you</u>	On this side, please respond to each statement thinking about how your coach treated your <u>team mates/team as a whole</u>
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1	2	3	4	5		1	2	3	4	5
1	2	3	4	5	The coach wants players to try new skills	1	2	3	4	5
1	2	3	4	5	The coach gets mad when a player makes a mistake	1	2	3	4	5
1	2	3	4	5	The coach gives most of his or her attention to the best players	1	2	3	4	5
1	2	3	4	5	The coach ensures that each player contributes in some important way	1	2	3	4	5
1	2	3	4	5	The coach believes all players are crucial to the success of the team	1	2	3	4	5
1	2	3	4	5	The coach praises players only when they outplay team mates	1	2	3	4	5
1	2	3	4	5	The coach thinks that only the players who start a match contribute to the team's success	1	2	3	4	5
1	2	3	4	5	The coach ensures players feel good when they try their best	1	2	3	4	5
1	2	3	4	5	The coach substitutes players when they make mistakes	1	2	3	4	5
1	2	3	4	5	The coach ensures players at all skill levels have an important role on the team	1	2	3	4	5
1	2	3	4	5	The coach encourages players to help each other learn	1	2	3	4	5
1	2	3	4	5	The coach encourages players to outplay other players	1	2	3	4	5
1	2	3	4	5	The coach has his or her favourite players	1	2	3	4	5
1	2	3	4	5	The coach makes sure players improve on skills they're not good at	1	2	3	4	5
1	2	3	4	5	The coach yells at players for messing up	1	2	3	4	5

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

On this side, please respond to each statement thinking about how your coach typically treated <u>you</u>	On this side, please respond to each statement thinking about how your coach treated your <u>team mates/ team as a whole</u>
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1	2	3	4	5	The coach ensures players feel successful when they improve	1	2	3	4	5
1	2	3	4	5	The coach only praises those players who perform the best during the match	1	2	3	4	5
1	2	3	4	5	The coach punishes players when they make a mistake	1	2	3	4	5
1	2	3	4	5	The coach ensures each player has an important role on the team	1	2	3	4	5
1	2	3	4	5	The coach rewards players who try hard	1	2	3	4	5
1	2	3	4	5	The coach encourages players to help each other learn	1	2	3	4	5
1	2	3	4	5	The coach makes it clear who he or she thinks are the best players	1	2	3	4	5
1	2	3	4	5	The coach makes players feel happy when they do better than their team-mates	1	2	3	4	5
1	2	3	4	5	The coach must think you are one of the best players if you want to play in a match	1	2	3	4	5
1	2	3	4	5	The coach emphasises always trying your best	1	2	3	4	5
1	2	3	4	5	The coach only notices the best players	1	2	3	4	5
1	2	3	4	5	The coach makes players afraid of making mistakes	1	2	3	4	5
1	2	3	4	5	The coach encourages players to work on their weaknesses	1	2	3	4	5
1	2	3	4	5	The coach favours some players more than others	1	2	3	4	5
1	2	3	4	5	The coach encourages players to improve in each game/practice	1	2	3	4	5
1	2	3	4	5	The coach encourages players to really work together as a team	1	2	3	4	5
1	2	3	4	5	The coach ensures that all players feel as if they are an important team member	1	2	3	4	5
1	2	3	4	5	The coach encourages players to help each other get better	1	2	3	4	5

Section B: Each coach has a different coaching style and no one style is necessarily better than another. On the left hand scale, we would like to know more about how you have felt about *your* interactions with your coach this season. On the right hand side, we would like to know more about your coach's interactions with your *team as a whole/your team-mates this season*.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

On this side, please respond to each statement thinking about **how your coach**

On this side, please respond to each statement thinking about **how your coach interacted with your**

typically with <i>you</i>					interacted	<i>team mates/team as a whole</i>				
1	2	3	4	5	My coach is less friendly with players if they don't make the effort to see things his/her way	1	2	3	4	5
1	2	3	4	5	My coach shouts at players in front of others to make them do certain things	1	2	3	4	5
1	2	3	4	5	My coach only uses rewards/praise so that players stay focused on tasks during training	1	2	3	4	5
1	2	3	4	5	My coach is less supportive of players when they are not training and playing well	1	2	3	4	5
1	2	3	4	5	My coach tries to control what players do during their free time	1	2	3	4	5
1	2	3	4	5	My coach threatens to punish players to keep them in line during training	1	2	3	4	5
1	2	3	4	5	My coach tries to motivate players by promising to reward them if they do well	1	2	3	4	5
1	2	3	4	5	My coach pays me less attention to players if they have displeased him/her.	1	2	3	4	5
1	2	3	4	5	My coach intimidates players into doing the things that he/she wants them to do	1	2	3	4	5
1	2	3	4	5	My coach tries to interfere in aspects of players' life outside of hockey	1	2	3	4	5
1	2	3	4	5	My coach only uses rewards/praise so that players complete all the tasks he/she sets during training	1	2	3	4	5
1	2	3	4	5	My coach is less accepting of players if they have disappointed him/her.	1	2	3	4	5
1	2	3	4	5	My coach embarrasses players in front of others if they do not do the things he/she wants them to do	1	2	3	4	5

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

On this side, please respond to each statement thinking about **how your coach typically interacted with *you***

On this side, please respond to each statement thinking about **how your coach interacted with your *team mates/team as a whole***

1	2	3	4	5	My coach only uses rewards/praise to make players train harder	1	2	3	4	5
1	2	3	4	5	My coach expects players' whole life to centre on hockey participation	1	2	3	4	5
1	2	3	4	5	Players are encouraged to feel the joy in playing hockey	1	2	3	4	5
1	2	3	4	5	The coach gives players choices and options	1	2	3	4	5
1	2	3	4	5	The coach makes sure that he or she really understands players' goals and what they need to do	1	2	3	4	5
1	2	3	4	5	The coach encourages players to ask questions	1	2	3	4	5
1	2	3	4	5	It is important to the coach that players participate in hockey because they really want to	1	2	3	4	5
1	2	3	4	5	The coach answers players' questions fully and carefully	1	2	3	4	5
1	2	3	4	5	The coach reminds players that playing hockey should be fun	1	2	3	4	5
1	2	3	4	5	The coach listens to how players would like to do things	1	2	3	4	5
1	2	3	4	5	The coach tries to understand how players see things before suggesting new ways to do things	1	2	3	4	5
1	2	3	4	5	The coach doesn't make players feel that they <i>have</i> to play hockey	1	2	3	4	5
1	2	3	4	5	When the coach asks players to do something, he/she tries to explain why this would be good to do so	1	2	3	4	5
1	2	3	4	5	The coach emphasizes to players that it is important to enjoy playing hockey	1	2	3	4	5
1	2	3	4	5	The coach tries to show players that he/she understand their feelings	1	2	3	4	5
1	2	3	4	5	Players can really count on the coach to be there when they need help	1	2	3	4	5
1	2	3	4	5	The coach accepts players totally, including both their worst and best points	1	2	3	4	5
1	2	3	4	5	Players can really count on the coach caring about them, no matter what happens	1	2	3	4	5

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

On this side, please respond to each statement thinking about **how your coach typically interacted with you**

On this side, please respond to each statement thinking about **how your coach interacted with your team mates/team as a whole**

1	2	3	4	5	Players can really count on the coach to help them feel better when they are feeling down	1	2	3	4	5
1	2	3	4	5	Players can really count on the coach to comfort them when they are upset	1	2	3	4	5
1	2	3	4	5	The coach really appreciates players as people, not just as football players	1	2	3	4	5
1	2	3	4	5	The coach listens openly and uncritically to players' personal feelings	1	2	3	4	5

Your OWN Views about playing Hockey

Section B: In this section the questions refer to your personal feelings and perceptions regarding your experiences during hockey (i.e., how have *you* been feeling during hockey?) during the last month. Please answer as honestly and carefully as possible and reflect on how you truly feel.

- a) The following questions relate to your general feelings and experiences playing hockey on this team during the last month.

<i>On this team, during the last month...</i>	Strongly disagree			Neutral			Strongly agree	
I decided which activities I wanted to practice in hockey.	1	2	3	4	5	6	7	
After training at hockey I felt quite capable.	1	2	3	4	5	6	7	
I had a say regarding what skills I wanted to practice.	1	2	3	4	5	6	7	
I did very well at hockey.	1	2	3	4	5	6	7	
I participated in hockey because I wanted to.	1	2	3	4	5	6	7	
I think I did quite well at hockey compared to other players.	1	2	3	4	5	6	7	
I had to force myself to play hockey.	1	2	3	4	5	6	7	
I was fairly skilful at hockey.	1	2	3	4	5	6	7	
I felt free to do some things my own way in hockey.	1	2	3	4	5	6	7	
I was satisfied with what I did in hockey.	1	2	3	4	5	6	7	

I had some choice in what I wanted to do in hockey. 1 2 3 4 5 6 7

b) The following questions relate to **your general feelings and experiences playing hockey on this team during the last month the last month.**

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I felt supported by the coach.	1	2	3	4	5
I felt understood by the coach.	1	2	3	4	5
I felt that the coach listened to me.	1	2	3	4	5
I felt valued by the coach.	1	2	3	4	5
I felt safe with the coach.		2	3	4	5

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I felt supported by my teammates.	1	2	3	4	5
I felt understood by my teammates.	1	2	3	4	5
I felt that my teammates listened to me.	1	2	3	4	5
I felt valued by my teammates.	1	2	3	4	5
I felt safe with my teammates.	1	2	3	4	5

c) The following questions relate to **your general feelings and experiences playing hockey on your team during the last month.**

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I usually enjoyed the activities in hockey.	1	2	3	4	5
I usually found hockey interesting.	1	2	3	4	5
I usually found that time flew when I was playing hockey.	1	2	3	4	5
I usually had fun when playing	1	2	3	4	5

a) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On this team, during the last month...</i>	Strongly disagree		Neutral			Strongly agree	
We decided which activities we wanted to practice in hockey.	1	2	3	4	5	6	7
After training at hockey we felt quite capable.	1	2	3	4	5	6	7
We had a say regarding what skills we wanted to practice.	1	2	3	4	5	6	7
We did very well at hockey.	1	2	3	4	5	6	7
We participated in hockey because we wanted to.	1	2	3	4	5	6	7
We think we did quite well at hockey compared to other teams.	1	2	3	4	5	6	7
We had to force ourselves to play hockey.	1	2	3	4	5	6	7
We were fairly skilful at hockey.	1	2	3	4	5	6	7
We felt free to do some things our own way in hockey.	1	2	3	4	5	6	7
We were satisfied with what we did in hockey.	1	2	3	4	5	6	7
We had some choice in what we wanted to do in hockey.	1	2	3	4	5	6	7

b) The following questions relate to the general feelings and experiences playing hockey in relation to your coach and teammates during the last month.

<i>On our team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We felt supported by the coach.	1	2	3	4	5
We felt understood by the coach.	1	2	3	4	5
We felt that the coach listened to us.	1	2	3	4	5
We felt valued by the coach.	1	2	3	4	5
We felt safe with the coach.	1	2	3	4	5

<i>On our team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
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We supported each other.	1	2	3	4	5
We understood each other.	1	2	3	4	5
We listened to each other.	1	2	3	4	5
We valued each other.	1	2	3	4	5
We felt safe with each other.	1	2	3	4	5

c) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On our team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We usually enjoyed the activities in hockey.	1	2	3	4	5
We usually found hockey interesting.	1	2	3	4	5
We usually found that time flew when we were playing hockey.	1	2	3	4	5
We usually had fun when playing hockey.	1	2	3	4	5
We usually got involved when playing hockey.	1	2	3	4	5

d) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On our team, during the last month...</i>	Not at All True		Somewhat True			Very True	
We felt full of enthusiasm.	1	2	3	4	5	6	7
We had high spirits.	1	2	3	4	5	6	7
We looked forward to each day.	1	2	3	4	5	6	7
We nearly always felt alert and awake.	1	2	3	4	5	6	7
We felt we had a lot of energy.	1	2	3	4	5	6	7
Sometimes we felt so alive we wanted to burst.	1	2	3	4	5	6	7

e) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On our team, during the last month...</i>	Almost Never	Rarely	Sometimes	Frequently	Almost Always
We felt so tired from our hockey training that we had trouble finding energy to do other things.	1	2	3	4	5
We felt overly tired from our hockey participation.	1	2	3	4	5
We felt “wiped out” from hockey.	1	2	3	4	5
We felt physically worn out from hockey.	1	2	3	4	5
We were exhausted by the mental and physical demands of hockey.	1	2	3	4	5

Section D: This final section relates to your feelings towards *your team* i.e., what is your perception of your team at this present time?

- a) The following questions ask about your feelings towards *your team*. Please circle a number from 1 to 9 to indicate how much you agree with each statement.

<i>On this team...</i>	Strongly Disagree					Strongly Agree			
	1	2	3	4	5	6	7	8	9
We share the same commitment to our team goals.	1	2	3	4	5	6	7	8	9
I invite my teammates to do things with me.	1	2	3	4	5	6	7	8	9
As a team, we are all on the same page.	1	2	3	4	5	6	7	8	9
Some of my best friends are on this team.	1	2	3	4	5	6	7	8	9
I like the way we work together as a team.	1	2	3	4	5	6	7	8	9
We hang out with one another whenever possible.	1	2	3	4	5	6	7	8	9
As a team, we are united.	1	2	3	4	5	6	7	8	9
I contact my teammates often (phone, text messages, internet).	1	2	3	4	5	6	7	8	9
This team gives me enough opportunities to improve my own performance.	1	2	3	4	5	6	7	8	9

I spend time with my teammates.	1	2	3	4	5	6	7	8	9
I am going to keep in contact with my teammates after the season ends.	1	2	3	4	5	6	7	8	9
I am happy with my team's level of desire to win.	1	2	3	4	5	6	7	8	9
We stick together outside of practice.	1	2	3	4	5	6	7	8	9
My approach to playing is the same as my teammates.	1	2	3	4	5	6	7	8	9
We contact each other often (phone, text message, internet).	1	2	3	4	5	6	7	8	9
We like the way we work together as a team.	1	2	3	4	5	6	7	8	9

Thank you for your cooperation.

INSTRUCTIONS

- Please answer all the questions as honestly and carefully as possible.
- There are no right or wrong answers so please answer as you truly feel.

- If anything is confusing, please ask for help and the researcher will assist you.
- All questions refer to *your team, your coach, or to you* specifically.

Enter your birthday here: ____/____/____

For example, if your birthday is 17th August 1998, please write: **17 / August / 1998**

What is the name of your team? _____

What is the name of your coach? _____

Information about you

Age: ____ Years ____ Months **Gender:** Female Male

What is your postcode (this is usually a six or seven digit code that is the last line of your home address, e.g., B15 2TT? If you do not know it, please write the name of your street and town)

What is your main/major sport? _____

What level do you play (check highest level)?

Recreational Club County Regional National International/Professional

How many years / seasons have you played on this team (played within this squad)? ____ years / seasons.

On average, how many hours per week do you train and compete on this team during the season?
Approximately ____ hours per week.

On average, how many hours per week do you spend (training/involved in competitions) with your coach? Approximately ____ hours per week.

Section A: 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 is like on your team most of the time? What kind of atmosphere does *your main coach* generally creates

“So far this season...”	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My coach encourages players to try new skills	1	2	3	4	5
My coach is less friendly with players if they don't see things his or her way	1	2	3	4	5
My coach gives players choices and options	1	2	3	4	5
My coach tries to make sure players feel	1	2	3	4	5

good when they try their best					
My coach substitutes players when they make mistakes	1	2	3	4	5
My coach thinks it is important that players participate in hockey because the players really want to.	1	2	3	4	5
My coach is less supportive of players when they are not training and/or playing well	1	2	3	4	5
My coach can really be counted on to care, no matter what happens	1	2	3	4	5
My coach gives most attention to the best players	1	2	3	4	5
My coach yells at players for messing up	1	2	3	4	5
My coach makes sure players feel successful when they improve	1	2	3	4	5
My coach pays less attention to players if they have displeased him or her	1	2	3	4	5
My coach acknowledges players who try hard	1	2	3	4	5
My coach really appreciates players as people, not just as hockey players	1	2	3	4	5

“So far this season...”	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
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
My coach answers players’ questions fully and carefully	1	2	3	4	5
My coach is less accepting of players if they have disappointed him or her	1	2	3	4	5
My coach makes sure that each player contributes in some important way	1	2	3	4	5
My coach has his or her favourite players	1	2	3	4	5
My coach only rewards players with prizes or treats if they have played well	1	2	3	4	5

My coach only praises players who perform the best during the match	1	2	3	4	5
When my coach asks players to do something, he or she tries to explain why this would be good to do	1	2	3	4	5
My coach makes sure everyone has an important role on the team	1	2	3	4	5
My coach shouts at players in front of others to make them do certain things	1	2	3	4	5
My coach thinks that only the best players should play in a match	1	2	3	4	5
My coach threatens to punish players to keep them in line during training	1	2	3	4	5
My coach listens openly and does not judge players' personal feelings.	1	2	3	4	5
My coach lets us know that all players are part of the team's success	1	2	3	4	5
My coach mainly uses rewards/praise to make players complete all the tasks he or she sets during training	1	2	3	4	5
My coach encourages players to help each other learn	1	2	3	4	5
"So far this season..."	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My coach tries to interfere in aspects of players' lives outside of hockey	1	2	3	4	5
My coach thinks it is important for players to play hockey because they (the players) enjoy it	1	2	3	4	5
My coach favours some players more than others	1	2	3	4	5
My coach encourages players to really work together as a team	1	2	3	4	5
My coach intimidates me into doing the things that he/she wants me to do	1	2	3	4	5
My coach only uses rewards/praise so that I stay focused on the task during training	1	2	3	4	5

My coach expects my whole life to centre on my sport participation	1	2	3	4	5
My coach embarrasses me in front of others if I do not do the things he/she wants me to do	1	2	3	4	5
My coach only rewards/praises me to make me train harder	1	2	3	4	5
My coach tries to control what I do during my free time	1	2	3	4	5
My coach encourages players to feel the joy of playing hockey					
My coach encourages players to ask questions					
My coach encourages players to participate in hockey because they really want to					
My coach listens to how players would like to do things					
My coach tries to understand how players see things before suggesting new ways to do things					
My coach tries to motivate players by promising to reward them if they do well					
My coach encourages players to focus on the fun they have when playing hockey					

Your Views about YOUR Hockey TEAM

Section B: In this section the questions refer to your perceptions regarding the feelings and experiences of *your hockey team* (i.e., how do you think *your team* has been feeling during hockey?) *during the last month*. Please answer as honestly and carefully as possible and reflect on how you believe *your team* has been feeling.

d) The following questions relate to the *general feelings and experiences of your team playing hockey during the last month*.

<i>On this team, during the last month...</i>	Strongly disagree	Neutral	Strongly agree
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We decided which activities we wanted to practice in hockey.	1	2	3	4	5	6	7
After training at hockey we felt quite capable.	1	2	3	4	5	6	7
We had a say regarding what skills we wanted to practice.	1	2	3	4	5	6	7
We did very well in hockey.	1	2	3	4	5	6	7
We participated in hockey because we wanted to.	1	2	3	4	5	6	7
We think we did quite well at hockey compared to other teams.	1	2	3	4	5	6	7
We had to force ourselves to play hockey.	1	2	3	4	5	6	7
We were fairly skilful at hockey.	1	2	3	4	5	6	7
We felt free to do some things our own way in hockey.	1	2	3	4	5	6	7
We were satisfied with what we did in hockey.	1	2	3	4	5	6	7
We had some choice in what we wanted to do in hockey.	1	2	3	4	5	6	7

e) The following questions relate to the *general feelings and experiences playing hockey in relation to your coach and teammates over the last month.*

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We felt supported by the coach.	1	2	3	4	5
We felt understood by the coach.	1	2	3	4	5
We felt that the coach listened to us.	1	2	3	4	5
We felt valued by the coach.	1	2	3	4	5
We felt safe with the coach.	1	2	3	4	5

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We supported each other.	1	2	3	4	5
We understood each other.	1	2	3	4	5
We listened to each other.	1	2	3	4	5
We valued each other.	1	2	3	4	5

We felt safe with each other. 1 2 3 4 5

f) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
We usually enjoyed the activities in hockey.	1	2	3	4	5
We usually found hockey interesting.	1	2	3	4	5
We usually found that time flew when we were playing hockey.	1	2	3	4	5
We usually had fun when playing hockey.	1	2	3	4	5
We usually got involved when playing hockey.	1	2	3	4	5

d) The following questions relate to the general feelings and experiences of your team playing hockey during the last month.

<i>On this team, during the last month...</i>	Not at All True		Somewhat True			Very True	
We felt full of enthusiasm.	1	2	3	4	5	6	7
We had energy and high spirits.	1	2	3	4	5	6	7
We looked forward to each day.	1	2	3	4	5	6	7
We nearly always felt alert and awake.	1	2	3	4	5	6	7
We felt we had a lot of energy.	1	2	3	4	5	6	7
Sometimes we felt so alive we wanted to burst.	1	2	3	4	5	6	7

e) The following questions relate to the general feelings and experiences of your team playing hockey team during the last month.

<i>On this team, during the last month...</i>	Almost Never	Rarely	Sometimes	Frequently	Almost Always
We felt so tired from our hockey training that we had trouble finding energy to do other things.	1	2	3	4	5

We felt overly tired from our hockey participation.	1	2	3	4	5
We felt “wiped out” from hockey.	1	2	3	4	5
We felt physically worn out from hockey.	1	2	3	4	5
We were exhausted by the mental and physical demands of hockey.	1	2	3	4	5

Your OWN Views about playing Hockey

Section C: In this section the questions refer to your personal feelings and perceptions regarding your experiences during hockey (i.e., how have *you, as one specific player on the team*, been feeling during hockey?). Please answer as honestly and carefully as possible and reflect on how you truly feel.

- d) The following questions relate to **your** general feelings and experiences playing hockey on your team during the last month.

<i>On this team, during the last month...</i>	Strongly disagree		Neutral			Strongly agree	
I decided which activities I wanted to practice in hockey.	1	2	3	4	5	6	7
After training at hockey I felt quite capable.	1	2	3	4	5	6	7
I had a say regarding what skills I wanted to practice.	1	2	3	4	5	6	7
I did very well in hockey.	1	2	3	4	5	6	7
I participated in hockey because I wanted to.	1	2	3	4	5	6	7
I think I did quite well at hockey compared to other players.	1	2	3	4	5	6	7
I had to force myself to play hockey.	1	2	3	4	5	6	7
I was fairly skilful at hockey.	1	2	3	4	5	6	7
I felt free to do some things my own way in hockey.	1	2	3	4	5	6	7
I was satisfied with what I did in hockey.	1	2	3	4	5	6	7
I had some choice in what I wanted to do in hockey.	1	2	3	4	5	6	7

- e) The following questions relate to **your** general feelings and experiences playing hockey on your team during the last month.

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I felt supported by the coach.	1	2	3	4	5
I felt understood by the coach.	1	2	3	4	5
I felt that the coach listened to me.	1	2	3	4	5
I felt valued by the coach.	1	2	3	4	5
I felt safe with the coach.	1	2	3	4	5

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I felt supported by my teammates.	1	2	3	4	5
I felt understood by my teammates.	1	2	3	4	5
I felt that my teammates listened to me.	1	2	3	4	5
I felt valued by my teammates.	1	2	3	4	5
I felt safe with my teammates.	1	2	3	4	5

f) The following questions relate to **your** general feelings and experiences playing hockey on your team during the last month.

<i>On this team, during the last month...</i>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I usually enjoyed the activities in hockey.	1	2	3	4	5
I usually found hockey interesting.	1	2	3	4	5
I usually found that time flew when I was playing hockey.	1	2	3	4	5
I usually had fun when playing hockey.	1	2	3	4	5
I usually got involved when playing hockey.	1	2	3	4	5

d) The following questions relate to **your** general feelings and experiences playing hockey on your team during the last month.

<i>On this team, during the last month...</i>	Not at All True	Somewhat True	Very True
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I felt full of enthusiasm.	1	2	3	4	5	6	7
I had energy and high spirits.	1	2	3	4	5	6	7
I looked forward to each day.	1	2	3	4	5	6	7
I nearly always felt alert and awake.	1	2	3	4	5	6	7
I felt I had a lot of energy.	1	2	3	4	5	6	7
Sometimes I felt so alive I wanted to burst.	1	2	3	4	5	6	7

e) The following questions relate to your general feelings and experiences playing hockey during the last month.

<i>On this team, during the last month...</i>	Almost Never	Rarely	Sometimes	Frequently	Almost Always
I felt so tired from my hockey training that I had trouble finding energy to do other things.	1	2	3	4	5
I felt overly tired from my hockey participation.	1	2	3	4	5
I felt "wiped out" from hockey.	1	2	3	4	5
I felt physically worn out from hockey.	1	2	3	4	5
I was exhausted by the mental and physical demands of hockey.	1	2	3	4	5

f) Below are a number of statements **relating to how you feel about yourself in your everyday life (i.e., all the things you do).** Please indicate how true these statements are for you and rate them on a scale from 1 (false) to 6 (true)

During the last month...	False	Mostly False	More False Than True	More True Than False	Mostly True	True
Overall, I had a lot to be proud of.	1	2	3	4	5	6
Overall, I was no good.	1	2	3	4	5	6
Most things I did, I did well.	1	2	3	4	5	6
Nothing I did ever seemed to turn out right.	1	2	3	4	5	6
Overall, most things I did turn out well.	1	2	3	4	5	6

Section D: This final section relates to your feelings towards *your team* i.e., what is your perception of your team at this present time?

b) The following questions ask about your feelings towards *your team*. Please circle a number from 1 to 9 to indicate how much you agree with each statement.

<i>On this team...</i>	Strongly Disagree					Strongly Agree			
	1	2	3	4	5	6	7	8	9
We share the same commitment to our team goals.	1	2	3	4	5	6	7	8	9
I invite my teammates to do things with me.	1	2	3	4	5	6	7	8	9
As a team, we are all on the same page.	1	2	3	4	5	6	7	8	9
Some of my best friends are on this team.	1	2	3	4	5	6	7	8	9
I like the way we work together as a team.	1	2	3	4	5	6	7	8	9
We hang out with one another whenever possible.	1	2	3	4	5	6	7	8	9
As a team, we are united.	1	2	3	4	5	6	7	8	9
I contact my teammates often (phone, text messages, internet).	1	2	3	4	5	6	7	8	9
This team gives me enough opportunities to improve my own performance.	1	2	3	4	5	6	7	8	9
I spend time with my teammates.	1	2	3	4	5	6	7	8	9
I am going to keep in contact with my teammates after the season ends.	1	2	3	4	5	6	7	8	9
I am happy with my team's level of desire to win.	1	2	3	4	5	6	7	8	9
We stick together outside of practice.	1	2	3	4	5	6	7	8	9
My approach to playing is the same as my teammates.	1	2	3	4	5	6	7	8	9
We contact each other often (phone, text message, internet).	1	2	3	4	5	6	7	8	9
We like the way we work together as a team.	1	2	3	4	5	6	7	8	9

Thank you for your cooperation.

Appendix 2

Descriptive information

1. Enter your birthday here: ____/____/____

For example, if your birthday is 17th August 1998, please write: 17 / 08 / 1998

2. What is your gender (tick one box only): Female Male

3.* (Optional) What is your postcode (this is usually a six or seven digit code that is the last line of your home address, e.g., B15 2TT? If you do not know it, please write the name of your street and town)

4. Which of the following would you say best describes your ethnic group (tick one box only)?

- | | | | | | |
|---------------------------|--------------------------|---------------|--------------------------|-----------------|--------------------------|
| British | <input type="checkbox"/> | Other mixed | <input type="checkbox"/> | Black Caribbean | <input type="checkbox"/> |
| Irish | <input type="checkbox"/> | Indian | <input type="checkbox"/> | Other black | <input type="checkbox"/> |
| White other | <input type="checkbox"/> | Pakistani | <input type="checkbox"/> | Chinese | <input type="checkbox"/> |
| White and Black Caribbean | <input type="checkbox"/> | Bangladeshi | <input type="checkbox"/> | East European | <input type="checkbox"/> |
| White and Black African | <input type="checkbox"/> | Other Asian | <input type="checkbox"/> | Other | <input type="checkbox"/> |
| White and Asian | <input type="checkbox"/> | Black African | <input type="checkbox"/> | | |

5. What is the name of the team you are playing/training for today?

6. How many seasons have you played on this team including this current season?

7. On average, how many hours per week have you trained and played for this team during a typical week in the last month?

_____hours

8. What is the name of your main coach for the team you are playing/training for today?

The name of the main coach for this team is

9. On average, how many hours per week do you spend with this coach?

_____hours

Section A: Each coach has a different coaching style and no one style is necessarily better than another. We would like to know more about how you view *your* typical interactions with your coach. Read each statement, and then please indicate the extent to which you agree or disagree using the scale to the right.

When completing this section, think about what it has usually been like on this team during the last 3 – 4 weeks. <i>In my Sport...</i>	Strongly Disagree		Neutral		Strongly Agree
1. My coach was less friendly with players if they didn't make the effort to see things his or her way.	1	2	3	4	5
2. My coach gave players choices and options.	1	2	3	4	5
3. My coach substituted players when they made a mistake.	1	2	3	4	5
4. My coach thought that it was important that players participated in hockey because the players really wanted to.	1	2	3	4	5
5. My coach was less supportive of players when they were not training and/or playing well.	1	2	3	4	5
6. My coach yelled at players for messing up.	1	2	3	4	5
7. My coach paid less attention to players if they displeased him or her.	1	2	3	4	5
8. My coach really appreciated players as people, not just as sportsmen or sportswomen.	1	2	3	4	5
9. My coach only allowed us to do something we liked to do at the end of training if players have done well during the session.	1	2	3	4	5
10. My coach answered players' questions fully and carefully.	1	2	3	4	5
11. My coach was less accepting of players if they disappointed him or her.	1	2	3	4	5
12. My coach made sure that each player contributed in some important way.	1	2	3	4	5
13. My coach only rewarded players with prizes or treats if they have played well.	1	2	3	4	5
14. My coach only praised players who performed the best during a match.	1	2	3	4	5
15. When my coach asked players to do something, he or she tried to explain why this would be a good thing to do.	1	2	3	4	5
16. My coach made sure everyone had an important role on the team.	1	2	3	4	5
17. My coach shouted at players in front of others to make them do certain things.	1	2	3	4	5
18. My coach thought that only the best players should play in a match.	1	2	3	4	5
19. My coach threatened to punish players to keep them in line during training.	1	2	3	4	5
20. My coach listened openly and did not judge players' personal feelings.	1	2	3	4	5
21. My coach lets us know that all the players are part of the team's success.	1	2	3	4	5
22. My coach mainly used rewards/praise to make players complete all the tasks he or she set during training.	1	2	3	4	5
23. My coach tried to interfere in aspect of players'	1	2	3	4	5

lives outside of hockey.					
24. My coach thought it is important for players to play hockey because they (the players) enjoy it.	1	2	3	4	5
25. My coach favoured some players more than others.	1	2	3	4	5

Section B: Please think about **how you viewed the atmosphere in your team over the past 3-4 weeks.** What was the atmosphere like on your team over the past few weeks? Read each statement, and then please indicate the extent to which you agree or disagree using the scale to the right.

When completing this section, think about what it has generally been like on your team over the past 3 - 4 weeks. <i>In my Sport...</i>	Strongly Disagree			Neutral			Strongly Agree
1. I felt prevented from making choices with regard to the way I trained.	1	2	3	4	5	6	7
2. There are situations where I was made to feel inadequate.	1	2	3	4	5	6	7
3. I felt pushed to behave in certain ways.	1	2	3	4	5	6	7
4. I felt rejected by those around me.	1	2	3	4	5	6	7
5. I felt forced to follow training decisions made for me.	1	2	3	4	5	6	7
6. I felt inadequate because I was not given opportunities to fulfil my potential.	1	2	3	4	5	6	7
7. I felt under pressure to agree with the training regime I was provided with.	1	2	3	4	5	6	7
8. I felt others could be dismissive of me.	1	2	3	4	5	6	7
9. Situations occurred in which I was made to feel incapable.	1	2	3	4	5	6	7
10. I felt other people disliked me.	1	2	3	4	5	6	7
11. There were times when I was told things that make me feel incompetent.	1	2	3	4	5	6	7
12. I felt that other people are envious when I achieved success.	1	2	3	4	5	6	7
13. I felt that I participated in my sport because I wanted to.	1	2	3	4	5	6	7
14. I was satisfied with what I could do in my sport.	1	2	3	4	5	6	7
15. When participating in my sport I felt supported.	1	2	3	4	5	6	7
16. I had some choice in what I wanted to do in my sport.	1	2	3	4	5	6	7
17. After training at my sport for a while I felt pretty competent.	1	2	3	4	5	6	7
18. When participating in my sport I felt understood.	1	2	3	4	5	6	7
19. I had a say regarding what skills I wanted to practice in my sport.	1	2	3	4	5	6	7
20. I think I did pretty well at my sport compared to other players/athletes.	1	2	3	4	5	6	7
21. When participating in my sport I felt listened to.	1	2	3	4	5	6	7
22. I felt a certain freedom of action in my sport.	1	2	3	4	5	6	7
23. I think I was pretty good at my sport.	1	2	3	4	5	6	7
24. When participating in my sport I felt valued.	1	2	3	4	5	6	7
25. I could decide which activities I wanted to practice in my sport.	1	2	3	4	5	6	7
26. I was pretty skilled at my sport.	1	2	3	4	5	6	7
27. When participating in my sport I felt safe.	1	2	3	4	5	6	7

Section C: The following questions ask about your feelings towards **YOUR TEAM**. Please indicate the extent to which you agree with each statement on the scale to the right.

When completing this section, think about what it has generally been like on <i>your</i> team over the past 3 – 4 weeks. <i>In my Sport...</i>	Strongly Disagree								Strongly Agree
1. We shared the same commitment to our team goals	1	2	3	4	5	6	7	8	9
2. I invited my teammates to do things with me	1	2	3	4	5	6	7	8	9
3. As a team, we were all on the same page	1	2	3	4	5	6	7	8	9
4. Some of my best friends were on this team	1	2	3	4	5	6	7	8	9
5. I liked the way we worked together as a team	1	2	3	4	5	6	7	8	9
6. We hung out with one another whenever possible	1	2	3	4	5	6	7	8	9
7. As a team, we were united	1	2	3	4	5	6	7	8	9
8. I contacted my teammates often (phone, text messages, internet)	1	2	3	4	5	6	7	8	9
9. This team gave me enough opportunities to improve my own performance	1	2	3	4	5	6	7	8	9
10. I spent time with my teammates	1	2	3	4	5	6	7	8	9
11. I am going to keep contact with my teammates after the season ends	1	2	3	4	5	6	7	8	9
12. I am happy with my team's level of desire to win	1	2	3	4	5	6	7	8	9
13. We stuck together outside of practice	1	2	3	4	5	6	7	8	9
14. My approach to playing was the same as my teammates	1	2	3	4	5	6	7	8	9
15. We contacted each other often (phone, text message, internet)	1	2	3	4	5	6	7	8	9
16. We liked the way we worked together as a team	1	2	3	4	5	6	7	8	9

Section D: Below are a number of statements relating to your general feelings and experiences playing your sport during the last month. Please indicate the extent to which you agree or disagree with each of the following statements; bear in mind **how you GENERALLY felt over the past month.**

Over the past 3-4 weeks, think about how you generally felt regarding your participation on this team. <i>In my Sport...</i>	Almost	Rarely	Sometimes	Frequently	Almost
1. I felt emotionally burned out in terms of my sports participation.	1	2	3	4	5
2. I felt physically 'wiped out' from					

my sport.					
3. I felt like I had little left in the emotional tank when playing my sport.	1	2	3	4	5
4. I felt physically tired from my sport training that I had trouble finding energy to do other things.					
5. I felt emotionally drained from my sport participation.	1	2	3	4	5
6. I am exhausted by the physical demands of my sport.					
7. I was exhausted by the emotional demands of my sport.	1	2	3	4	5
8. My body felt overly tired from my sport participation.					

Over the past 3-4 weeks, think about how you generally felt regarding your participation on this team. <i>In my Sport...</i>	Not at All						Very True
1. I felt alive and vital.	1	2	3	4	5	6	7
2. Sometimes I felt so alive I just wanted to burst.	1	2	3	4	5	6	7
3. I had energy and spirit.	1	2	3	4	5	6	7
4. I looked forward to each new day.	1	2	3	4	5	6	7
5. I nearly always felt alert and awake.	1	2	3	4	5	6	7
6. I felt energized.	1	2	3	4	5	6	7

During the last 3 to 4 weeks, when I was playing sport with this team, I generally felt...	Almost Never	Rarely	Sometimes	Frequently	Almost Always
1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

End of the questionnaire. Thank you!

SECTION A: PLEASE FILL THIS SECTION IN IMMEDIATELY BEFORE TRAINING

Please fill in the blank, tick the box, or circle the appropriate response when responding to the questions below.

ID NUMBER
 Enter your date of birth and how many brothers and/or sisters you have in total (e.g., 12/5/1988-1).
ANSWER HERE: ____/____/____-____
D M Y #

What day is it today? What date is it today?

What is the time when you begin this diary entry?

This training session is due to start at..... and finish at.....

What is the name of your main coach for the team you are playing/training for today?

The name of the main coach for this team is.....

<u>RIGHT NOW/at THIS MOMENT</u> I feel...	Not at all	A Little	Moderately	Quite a bit	Extremely
1. stressed	1	2	3	4	5
2. excited	1	2	3	4	5
3. upset	1	2	3	4	5
4. cared	1	2	3	4	5
5. enthusiastic	1	2	3	4	5
6. alert	1	2	3	4	5
7. inspired	1	2	3	4	5
8. nervous	1	2	3	4	5
9. determined	1	2	3	4	5
10. afraid	1	2	3	4	5

<u>RIGHT NOW/at THIS MOMENT</u>	Almost	Rarely	Sometimes	Frequently	Almost
1. I feel emotionally drained from my sport participation.	1	2	3	4	5
2. I feel exhausted by the emotional demands of my	1	2	3	4	5

sport.					
3. I feel physically 'wiped out' from my sport.	1	2	3	4	5
4. My body feels overly tired from my sport participation.	1	2	3	4	5

RIGHT NOW/at THIS MOMENT	Not at All						Very True
1. I feel energised.	1	2	3	4	5	6	7
2. I feel alert and awake.	1	2	3	4	5	6	7

**End of this diary entry. Thank you!
Don't forget to complete section B after training!**

SECTION B: PLEASE FILL THIS SECTION IN IMMEDIATELY AFTER TRAINING

Please respond to the following items, thinking about how you felt in the training session you have just attended:

In this training session...	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My coach gave players choices and options.	1	2	3	4	5
2. My coach shouted at players in front of others to make them do certain things.	1	2	3	4	5
3. My coach listened openly and did not judge players' personal feelings.	1	2	3	4	5
4. I felt I was allowed to feel satisfied with my performance in training.	1	2	3	4	5
5. I felt there were situations where I was made to feel inadequate.	1	2	3	4	5
6. I felt people valued me.	1	2	3	4	5
7. I felt pushed to behave in certain ways.	1	2	3	4	5
8. I felt rejected by those around me.	1	2	3	4	5
9. I felt free to express my ideas and opinions.	1	2	3	4	5

RIGHT NOW/at THIS MOMENT I feel...	Not at all	A Little	Moderate	Quite a bit	Extremely
1. I feel stressed	1	2	3	4	5
2. I feel excited	1	2	3	4	5

3. upset	1	2	3	4	5
4. cared	1	2	3	4	5
5. enthusiastic	1	2	3	4	5
6. alert	1	2	3	4	5
7. inspired	1	2	3	4	5
8. nervous	1	2	3	4	5
9. determined	1	2	3	4	5
10. afraid	1	2	3	4	5

<u>RIGHT NOW/at THIS MOMENT</u>	Almost	Rarely	Sometime	Frequentl	Almost
1. I feel emotionally drained from my sport participation.	1	2	3	4	5
2. I feel exhausted by the emotional demands of my sport.	1	2	3	4	5
3. I feel physically 'wiped out' from my sport.	1	2	3	4	5
4. My body feels overly tired from my sport participation.	1	2	3	4	5

<u>RIGHT NOW/at THIS MOMENT</u>	Not At All						Very True
1. I feel energised.	1	2	3	4	5	6	7
2. I feel alert and awake.	1	2	3	4	5	6	7

When completing this section, think about what it was like on <i>your</i> team in this recently completed training session. In this training session ...	Strongly								Strongly Agree
1. We shared the same commitment to our team goals.	1	2	3	4	5	6	7	8	9
2. Some of my best friends were on this team.	1	2	3	4	5	6	7	8	9
3. As a team, we were united.	1	2	3	4	5	6	7	8	9
4. I invited my teammates to do things with me.	1	2	3	4	5	6	7	8	9

End of this diary entry. Thank you!

