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Team Effectiveness in Professional Cricket

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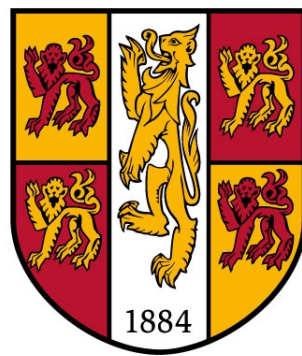
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Team Effectiveness in Professional Cricket



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A thesis submitted in partial fulfilment of the requirements for
the Degree of Doctor of Philosophy in September 2018 by:

Leonie Webster

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Thesis Abstract

To produce superior team performances members must be able to work well together to exceed the sum of their parts. Despite an extensive body of research in healthcare, business, military, and aviation, there is limited understanding of what effective teams *do* in sport. In an attempt to address this gap in the literature the present doctoral thesis – commissioned by the England and Wales Cricket Board (ECB) - sought to uncover, measure, test, and improve the most important factors for team effectiveness in cricket. The thesis contains three empirical studies which address the following research questions: (i) what factors contribute to the effectiveness of cricket teams? (ii) How can team functioning and effectiveness be measured? (iii) Can factors of team functioning accurately predict effective cricket teams, and what is the relative importance of those factors? (iv) Can team functioning and effectiveness be improved in cricket teams? Chapter 1 of the thesis defines some of the key terms associated with the group-based literature, before critically reviewing the organisational and sport psychology literature on team effectiveness and group dynamics, highlighting limitations that need to be addressed. These include a lack of research attention on *teamwork* or *team functioning* in sport, the investigation of group-related variables in sport in isolation, an overreliance on deductive approaches to framework development, a lack of appropriate measures, and the exclusive focus upon the development of cohesion within team building interventions in sport. Chapter 2 is an abductive, qualitative investigation involving 21 cricket experts, which explores the factors most important for team effectiveness in cricket. Based on this elite samples' construal, we propose a parsimonious and novel conceptualisation of team effectiveness in cricket (Essential Team Ingredients model; ETI). Chapter 3 contains two studies concerned with the development and validation of the Inventory of Essential Team Ingredients (IETI), designed to measure each sub-component of the ETI model. The first study adopted a new paradigm of measurement design to validate a

multi-construct, single-item based inventory. The second study examined the extent to which factors within the ETI model could accurately predict effective teams in a sample of 32 high performing male and female cricket teams. Through the application of novel pattern recognition analyses, results suggested that certain features could accurately predict an effective team in nearly 90% of instances. Chapter 4 presents an intervention study, whereby a team building intervention based on the IETI was designed, delivered and evaluated, providing an indication that team functioning can be improved over a short period, and preliminary evidence for the utility of the IETI. Finally, Chapter 5 concludes the thesis by discussing some of the theoretical, conceptual, and applied implications of the findings, as well as the strengths and weaknesses of the research and potential avenues of future research.

Thesis Format

This thesis consists of three empirical chapters comprising of four separate studies designed to address the overall objectives of the PhD. These empirical chapters are bookended by two theoretical chapters which introduce and conclude the thesis respectively. Whilst this does not necessarily represent a traditional thesis format, each empirical chapter has been written in manuscript form with the purpose of publication within a peer-reviewed academic journal. This has facilitated the development of the PhD candidate as an academic researcher. Chapter 2 has already been successfully published within a peer-reviewed journal. The citation for this publication is: Webster, L. V., Hardy, J., & Hardy, L. (2017). Big Hitters: Important Factors Characterizing Team Effectiveness in Professional Cricket. *Frontiers in Psychology*, 8, 1140. Chapter 3 is currently being prepared for publication, and it is anticipated that Chapter 4 will be rewritten as an applied case study for publication in an appropriate applied Sport Psychology outlet. Due to this thesis format there is inevitably some repetition of content, although a concerted effort was made to keep this to a minimum wherever possible.

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Curriculum Vitae

As a performance psychologist and researcher, I am looking to contribute to the understanding and development of excellence in high performance sport. I have proven ability of delivering individual and group psychological support within an elite environment and am eager to apply and develop my skills within a World Class sporting organisation.

Skills

Research: Ability to produce scientific findings of the highest quality by drawing on skills such as project management, research design, and data analysis.

Communication: Significant writing experience, taking an audience-first approach to serve experts and laypeople alike.

Interpersonal: Extensive experience working as part of a team, and ability to develop working relationships with individuals of all ages and apply strong interpersonal skills when in positions of leadership.

Organisation: Extremely self-motivated with the ability to generate and manage my workload successfully to meet deadlines whilst maintaining high standards.

Education

British Psychological Society - <i>Qualification in Sport and Exercise Psychology</i>	Mar 2016 – Jun 2018
Bangor University – <i>PhD (funded by England and Wales Cricket Board): What makes a cricket team better than the sum of its parts?</i>	Sep 2013 – Apr 2018
University of Derby – <i>PGDip Psychology</i>	May 2014 – Jul 2016
Southampton Solent University – <i>PGCert Teaching & Learning in Higher Education</i>	Oct 2009 – Jul 2010
Loughborough University – <i>MSc Sport & Exercise Psychology (Distinction)</i>	Oct 2007 – Dec 2008
Loughborough University – <i>BSc Sport Science & Social Science (1st Class Honours)</i>	Oct 2004 – Jul 2007
Tiffin Girls' School – <i>A Levels in Biology (C), Psychology (A) & Sport Studies (A). 10 GCSEs grade A* - B</i>	Sep 1995 – Jul 2002

Work Experience

English Institute of Sport (RFU). January 2017 – April 2018

Performance Psychologist (trainee) for the England Women's Rugby 15s: I provided psychology support as part of a multi-disciplinary team in the build up to, and throughout the Women's Rugby World Cup 2017 and into the 2017/2018 season. At a pivotal time for women's rugby, with players becoming full-time athletes and a vastly increased media profile for the sport, I contributed to the creation of a high-performance culture and team environment. In addition, I supported individuals by building awareness of self and others through the application of personality profiling and personal development plans. I also provided ongoing one to one support for athletes and staff, including referral onto clinical psychology services where appropriate.

England and Wales Cricket Board, UK. September 2013 – March 2017

Performance Psychologist (trainee) for the England Women's Pathway: Worked as part of a multi-disciplinary sport science support team with the England Women's Performance and Development programs. England Women had recently turned professional and appointed a high-profile head coach. I developed individual understanding of self, mind, and method through the delivery of bi-annual psychological screening with all players. I worked with individual athletes to improve consistency of performance through the application of appropriate behavioural interventions, and facilitated greater teamwork through psychological education and the application of my own research findings. The success of these ventures was a result of regular liaison with coaches and parents.

Southampton Solent University, UK. October 2012 – August 2013

Associate Lecturer: Taught Sport Psychology and Study Skills across all levels of undergraduate study, designing and delivering appropriate teaching and assessment materials. Supervised third year, dissertation students.

Research Assistant Designed research projects and applied for research funding across a range of projects in the Sport Science department, resulting in successful internal funding bid.

Southampton Solent University, UK. May 2009 – Aug 2011

Senior Lecturer: Designed, developed and taught on the Sport Foundation course and Sport Psychology units. To ensure students gained the knowledge and understanding required to successfully pass each unit, I prepared, marked, and moderated all assignments, and supervised student projects. As course leader I provided pastoral care and completed management duties.

Research Assistant: Worked on a project to encourage apprentices into higher education through the application of a blended learning foundation course. I conducted and analysed focus groups and interviews to determine barriers to higher education, and presented progress reports to those who commissioned the research. I also designed and delivered the foundation course.

Publications

- Webster, L. V., Hardy, J., & Hardy, L. (2017). Big Hitters: Important Factors Characterizing Team Effectiveness in Professional Cricket. *Frontiers in psychology*, 8, 1140. DOI: <https://doi.org/10.3389/fpsyg.2017.01140>
- Webster, L., Benson, A., Hardy, J., & Roberts, R. (2014). Competing for the spotlight: The interactive effect of leader and follower narcissism on group goal commitment. *Journal of Exercise, Movement, and Sport*, 46(1).
- Bruce-Low, S. S., Burnet, S., Arber, K., Price, D., Webster, L., & Stopforth, M. (2013). Interactive mobile learning: a pilot study of a new approach for sport science and medical undergraduate students. *Advances in physiology education*, 37(4), 292-297. DOI: <https://doi.org/10.1152/advan.00004.2013>
- Bruce-Low S, Smith D, Burnet S, Fisher J, Bissell G, Webster L. (2012). One lumbar extension training session per week is sufficient for optimal strength gains and reductions in low back pain in chronic participants. *Ergonomics*: 55 (4), 500-507. DOI: <https://doi.org/10.1080/00140139.2011.644329>
- Stopforth M.L., Webster, L. & Johnson, M. (2010). The relationship between attributional style and fear of failure. Presented at the *British Psychological Society Division of Sport and Exercise Psychology*, 9-10th December.

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Monumental thanks goes to my partner Lucy for spending a year driving the 500 mile round trip to visit me in Bangor before moving to Shrewsbury and later to Ascot just to

support my career progression. She has been incredibly patient and tolerant of me throughout all the ups and downs of the past four years and provided me with unconditional love and support. I am incredibly grateful to her, and also apologetic for all of the stress that the whole process may have caused! Ned the dog has also been an invaluable distraction and source of stress relief over the past two years; thanks for all the walks Ned! A massive thank you also to my parents and sister Charlie whose unwavering emotional (and tangible at times) support keeps me striving towards my goals and provides me with the belief that I can achieve them.

Finally, I could not have wished for a better supervisory team than James and Lew. This PhD would not have been possible without their wisdom, patience, support, and advice. I am incredibly grateful to have had the opportunity to be supervised by Lew, whose knowledge and insight of Sport Psychology and beyond is unrivalled. You inspire me to continue to advance knowledge and understanding and contribute to high quality research and practice. Thank you, James, for always being available, for answering even the most trivial of questions, and for all the feedback and advice that you have provided. I cannot have wished for a better, more approachable and generous supervisor than you.

Chapter 1

General Introduction

There are numerous examples of seamless coordination in sport, where individuals work in concert to achieve common objectives. For example, a complex American football play which results in the quarterback delivering the ball straight into the hands of the wide receiver for a touchdown, or a cricket fielder leaping into the air to save a boundary, whilst simultaneously throwing the ball in-field to be caught by a teammate. In these instances, team members are required to organise their interdependent actions to attain superior team performance; commonly referred to as teamwork. Teamwork is frequently used to explain highly successful sports teams, however as a scientific construct, teamwork has aroused limited research interest in sport (Carron, Martin, & Loughhead, 2012). Despite a wealth of knowledge on the science of team performance in both social and organisational psychology, we have yet to develop a rich understanding of what effective teams do in sport.

Definitions

Many constructs associated with teams have been investigated over the years. It is important at the outset to clarify several of the fundamental concepts related to teams.

Teams are groups of two or more individuals who have specific roles and interdependence, and possess a common goal (Dyer, 1984). Cricket teams represent an atypical, yet interesting sample to study, as they are characterised by less interdependence relative to some other sports teams (e.g., basketball; Halevy, Chou, Galinsky, & Murnighan, 2012). *Teamwork* refers to the independent and interdependent behaviours required to achieve a teams' purposes and has been the most extensively studied construct related to teams in the organisational literature (McEwan & Beauchamp, 2014). However, the term *team functioning* is adopted throughout the present thesis to more accurately account for all variables (as opposed to an exclusive focus on behavioural processes; cf. Rousseau, Aube, & Savoie, 2006) that enable a team to work together effectively. Finally, the terms *effectiveness* and *performance*, as consequences of team functioning, are often used interchangeably (Kendall

& Salas, 2004). However, team performance – the most salient and valued indicator of team effectiveness (Kozlowski, Grand, Baard, & Pearce, 2015) – fails to account for how the team interacts to achieve its outcome (Salas, Sims, & Burke, 2005). Team effectiveness is therefore better represented by multiple, complimentary indicators. Cohen and Bailey (1997), for example, conceptualised effectiveness as comprising of performance, attitudes, and behaviours.

Models of Team Effectiveness

Organisational psychology has a rich history of research into team effectiveness, with numerous published reviews (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Bell, 2003; Mathieu, Maynard, Rapp, & Gilson, 2008; Kozlowski, 2018). Despite a notable lack of consensus on how best to conceptualise the variables that contribute to effective team performances, an input-process-outcome heuristic (IPO; McGrath, 1964) has shaped much of the current thinking; whereby individual, team, and environmental characteristics are transformed by team member interactions into the by-products of team activity (see Figure 1.1). *Inputs* relate to the composition of a team with respect to member individual differences (i.e., knowledge, skills, ability, and attitude), and individual, team, and organisational resources. *Processes* describe team members' actions and interactions that combine collective resources to accomplish task demands and goals (e.g., communication and coordination; Kozlowski, 2018). *Outcomes* are the valued results of team activity, often including performance, team viability, and member satisfaction (Hackman, 1987). Team processes are considered the primary contributors to team effectiveness, and as such, have received the most research attention (Kozlowski, 2018).

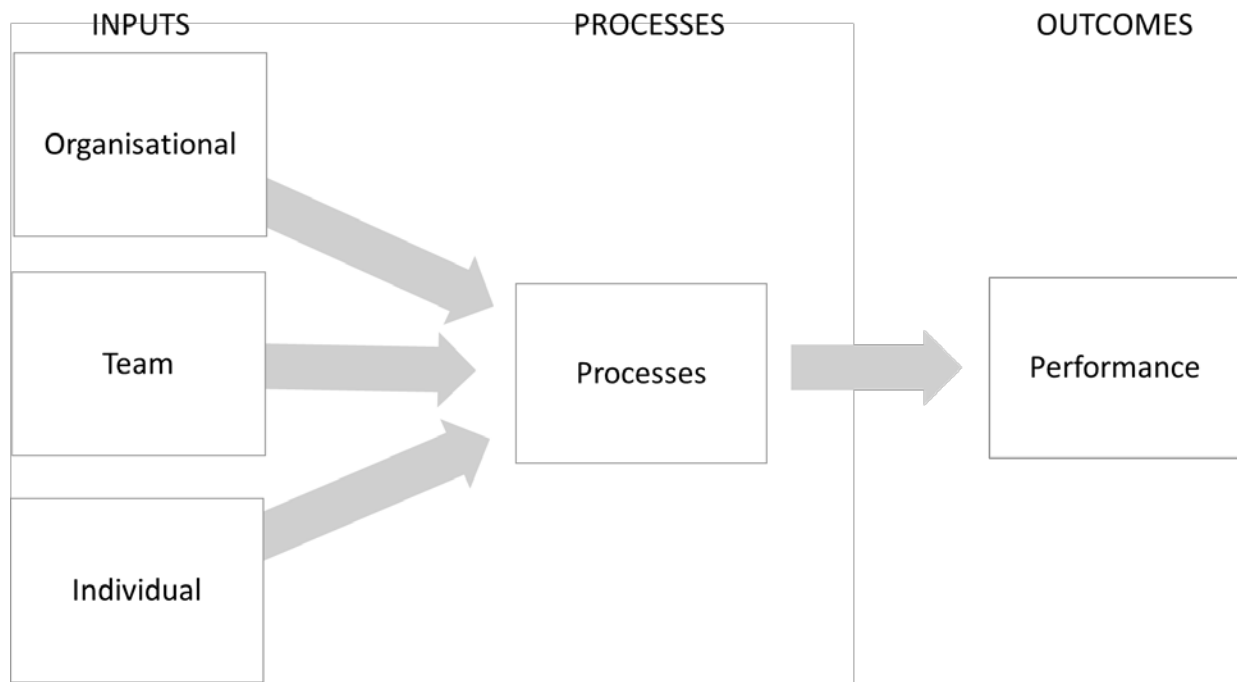


Figure 1.1. Input-Process-Outcome Framework (McGrath, 1964)

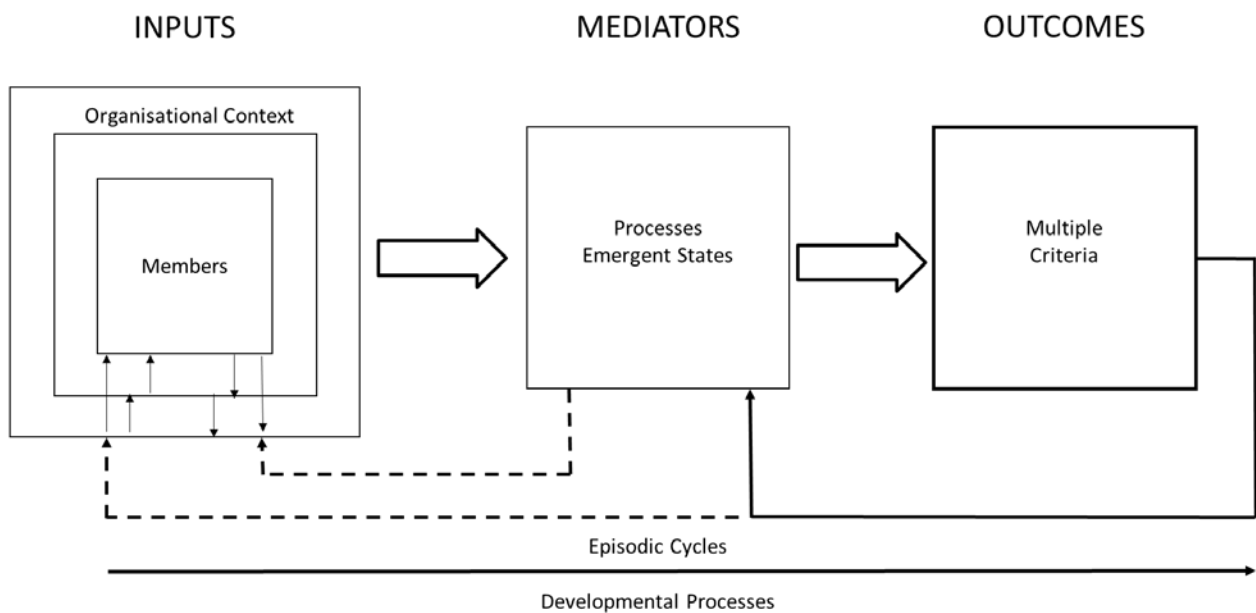


Figure 1.2. Input-Mediator-Outcome-Input Framework (Ilgen et al., 2005; Mathieu et al., 2008)

However, IPO models have increasingly been viewed as a limiting factor in the advancement of more creative, multilevel, and dynamic theories (cf., Ilgen et al., 2005; Mathieu et al., 2008). A common criticism of IPO models is that they fail to reflect the multi-level nature of teams. For example, professional athletes are nested in teams, which in turn are nested in wider commercial organisations, which are often governed by an organising body. The amount of funding an organisation has will influence the quantity and quality of resources available, which in turn will impact the team, and individual attributes of the athletes. IPO models also adopt a static perspective on team effectiveness which overlooks the underlying dynamic processes inherent in teams. For example, a team that has suffered a number of losses in a season has ground to make up in their respective league, therefore the processes that they require to be effective may be different to those utilised earlier in the season (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017). It might be that the successive losses result in increased tension between team members, making the process of conflict management (cf. Rousseau et al., 2006) particularly important. Finally, IPO models fail to recognise that many of the variables that transmit the influence of inputs into outcomes are not processes (Ilgen et al., 2005). Trust, for example, is not a behavioural process; it develops over time and may serve as an input which influences team processes such as communication, but may also represent a valued team-level outcome.

More recent conceptualisations address these limitations and advance the IPO model in a number of ways (see Figure 1.2). First, Mathieu et al. (2008) demonstrate the multiple levels of influence that team inputs have on mediators and outputs. Specifically, individual level inputs (e.g., member ability, self-efficacy) fall within a particular team context (e.g., team norms, leadership), which in turn sits within a broader organisational system (e.g., cultural influences, organisational funding). Second, the temporal aspect of teams is captured through episodic approaches which contend that teams execute different processes at

different times (Marks, Mathieu, & Zaccaro, 2001). Marks et al. developed a taxonomy of team processes that included three superordinate categories: transition, action, and interpersonal. During transition phases, team members reflect on previous performances and plan for future work. Such activities include mission analysis, goal specification, and formulating strategies. Later, during action phases, members concentrate on task accomplishments, monitoring progress and systems, and coordinating with, monitoring, and backing up their teammates. Last, the interpersonal category includes conflict management, motivation/confidence building, and affect management. All of which are salient across every episodic phase. Meta-analytic findings provide support for this hierarchical arrangement and reveal a positive relationship between teamwork processes and performance (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008). Third, processes are more accurately represented as *mediators*, which include the concept of emergent states. These are team properties that result from previous experiences and team interactions, and develop over time to shape subsequent processes. Emergent states commonly include team cohesion, the strength of social and task related bonds among team members (Carron & Eys, 2012); collective efficacy, a group's shared belief in their ability to achieve given levels of attainment (Bandura, 1997); and team mental models (TMMs), team members shared and organised understanding of relevant knowledge (Cannon-Bowers, Salas, & Converse, 1993). Various meta-analyses demonstrate the relevance of emergent states for team effectiveness, revealing significant, positive relationships between these variables and team performance (e.g. Beal, Cohen, Burke, & McLendon, 2003; Stajkovic, Lee, & Nyberg, 2009; DeChurch & Mesmer-Magnus, 2010).

Processes and emergent states have received the most frequent research attention to date. These mediating variables enable the integration of individuals' effort towards the accomplishment of shared goals, thus represent the very essence of teamwork or team functioning (Kozlowski, 2018). The empirical literature supporting the role of processes and

emergent states on valued team and individual outcomes is abundant and mature, with numerous supporting meta-analyses (Mathieu et al., 2017). Whilst it is unrealistic to do justice to the prolific body of literature within this thesis, the sections which follow attempt to summarise some significant findings that influenced much of the thinking behind the present research.

In addition to the emergent states referred to above (cohesion, collective efficacy, and TMMs), more recent reasoning has conceptualised both conflict (DeChurch, Mesmer-Magnus, & Doty, 2013), and trust (Burke, Sims, Lazzara, & Salas, 2007) as emergent states that play a key role in team functioning and effectiveness. Team conflict states are shared perceptions among members of the team about the intensity of disagreements over either tasks (i.e., goals, ideas, and performance strategies), or relationships (i.e., personality clashes, interpersonal styles). Team conflict processes describe what is commonly termed conflict management (DeChurch et al., 2013). Conflict is inevitable whenever interdependencies occur (Deutsch, 1949), therefore it is unsurprising that there is a rich history on this topic, and the process of conflict management is included in many frameworks of team effectiveness (cf. Rousseau et al., 2006). Meta-analytic evidence suggests that relationship conflict has a consistently negative effect on team performance, and task conflict – contrary to much theorising - has a negligible relation with team performance (de Wit, Greer, & Jehn, 2012; DeChurch et al., 2013; O'Neill, Allen, and Hastings, 2013). The benefits and detriments of task conflict are seemingly more complex than simple, direct relationships can capture (O'Neill, & McLarnon, 2017), although empirical research clearly indicates that relationship conflict needs to be managed and minimised to limit detrimental effects upon performance.

Trust, one of the most studied concepts in organisational research (De Jong, Kroon, & Schilke, 2017), is fundamental to teams. When members work interdependently, they must be

willing to accept a certain amount of risk to rely on each other to attain mutual goals (Salas et al., 2005). Group trust is a perception shared by team members about their confidence in the competence, compassion, and sincerity of the other members in situations entailing risk (Rousseau, Sitkin, Burt, & Camerer, 1998). A recent meta-analysis confirmed that intrateam trust is positively related to team performance, with an above average effect size ($p = .30$; De Jong, Dirks, & Gillespie, 2016). Trust has also been identified as important part of numerous leadership theories (e.g., transformational leadership; Podsakoff, MacKenzie, Moorman, & Fetter, 1990), and trust in leader has been found to influence processes such as communication, cooperation, and information sharing (e.g., Ferrin, Dirks, & Shah, 2003), and contributes to improved team performance (Dirks, 1999; 2000).

The act of sharing information, or communicating openly often involves a degree of vulnerability, thus trust in team and leader heavily influences communication (Grossman & Feitosa, 2017). Defined as an exchange of information among team members (Adams, 2007), communication is a critical component of team performance (Marlow, Lacerenza, Paoletti, Burke, & Salas, 2018), integral to the majority of team processes (Marks et al., 2001). Meta-analyses reveal unique information sharing (i.e., discussion of unshared information) and openness of information sharing (i.e., discussion of broad, encompassing team information) are significantly positively related to performance ($p = .42$; Mesmer-Magnus & DeChurch, 2009; Mesmer-Magnus, DeChurch, Jimenez-Rodriguez, Wildman, & Shuffler, 2011). However, communication has been defined in various ways that do not necessarily align with the concept of information sharing (MacMillan, Entin, & Serfaty, 2004), therefore the relationship between communication and performance has historically been inconsistently supported. To address this shortcoming, a recent meta-analysis examined the moderating influence of a variety of different types of communication on performance (Marlow et al., 2018). Marlow and colleagues found that the quality of communication (i.e., the extent to

which communication adequately distributes pertinent information among team members), and ensuring that information provided was understood and utilised, were the strongest predictors of performance, providing important practical implications for how communication should be conceptualised, measured, and improved.

Finally, Zaccaro, Rittman, and Marks (2001) argue that effective leadership processes represent one of the most important factors in the success of teams. However, meta-analytic results reveal only moderate relations between both task- and person-focused leadership and perceived team effectiveness (Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006). Rather than influence performance directly, leadership – as a team-level input factor--influences the team processes (e.g., information exchange; Kearney & Gebert, 2009) and emergent states (e.g., cohesion; Bass, Avolio, Jung, & Berson, 2003, and trust; Schaubroeck, Lam, & Peng, 2011) necessary for team effectiveness. In examining leadership behaviours that influence team performance, scholars have turned to transformational leadership theory (Bass, 1985) which suggests that exceptional performance is created by a sense of mission and new ways of thinking and learning (Lord, Day, Zaccaro, Avolio, & Eagly, 2017). Taken together, existing research attests to associations between one of the most widely studied forms of leadership over the last 20 years and team processes and outcomes (Lord et al., 2017).

The field of team effectiveness has been described as messy, with too many models, constructs, and conflicting findings (Kozlowski & Ilgen, 2006). Therefore, a challenge for practitioners attempting to build and refine teams lies in the assimilation of this array of literature into a manageable set of principles. Salas et al. (2005) attempted to do just this with the ‘Big Five’; a parsimonious, yet practically relevant model of teamwork (see Figure 1.3). *Leadership*, the ability to direct and coordinate the activities of members; *mutual performance monitoring*, the application of strategies to accurately monitor teammate

performance; *backup behaviour*, the ability to anticipate teammates' needs and shift workload accordingly; *adaptability*, the ability to adjust strategies based on information gathered from the environment; and *team orientation*, belief in the importance of the team's goals over individual goals, are cited as the components that most strongly affect team performance. The "Big Five", in turn, are transformed and facilitated by three coordinating mechanisms: *shared mental models*, shared knowledge about the task and how the team will interact; *mutual trust*, the shared belief that team members will perform their roles and protect the interests of their teammates; and *closed loop communication*, exchange of information between sender and receiver (King et al., 2008). These components appear in many other teamwork taxonomies, and Salas and colleagues make valuable suggestions as to how they can be applied in the development and maintenance of teams. Notably, the framework provides the basis of TeamSTEPPS (King et al., 2008), a systematic approach to improving team effectiveness in healthcare practice, which has resulted in significant improvements in teamwork skills and performance across a range of healthcare contexts (Mayer et al., 2011; Lisbon et al., 2016; Weld et al., 2016).

In a further attempt to provide some consensus on the conceptualisation of teamwork Rousseau and colleagues (2006) reviewed 29 frameworks of teamwork behaviours. The resultant conceptualisation (Figure 1.4) presents the most fundamental teamwork behaviours as functioning either to regulate team performance (preparation, collaboration and cooperation, work assessment, team adjustment), or manage team maintenance (psychological support, conflict management). However, this model is not truly representative of the wider body of literature and the numerous variables that influence team performance, as the review reported only the behavioural dimensions relevant to teamwork. Constructs such as conflict and leadership were omitted from the review.

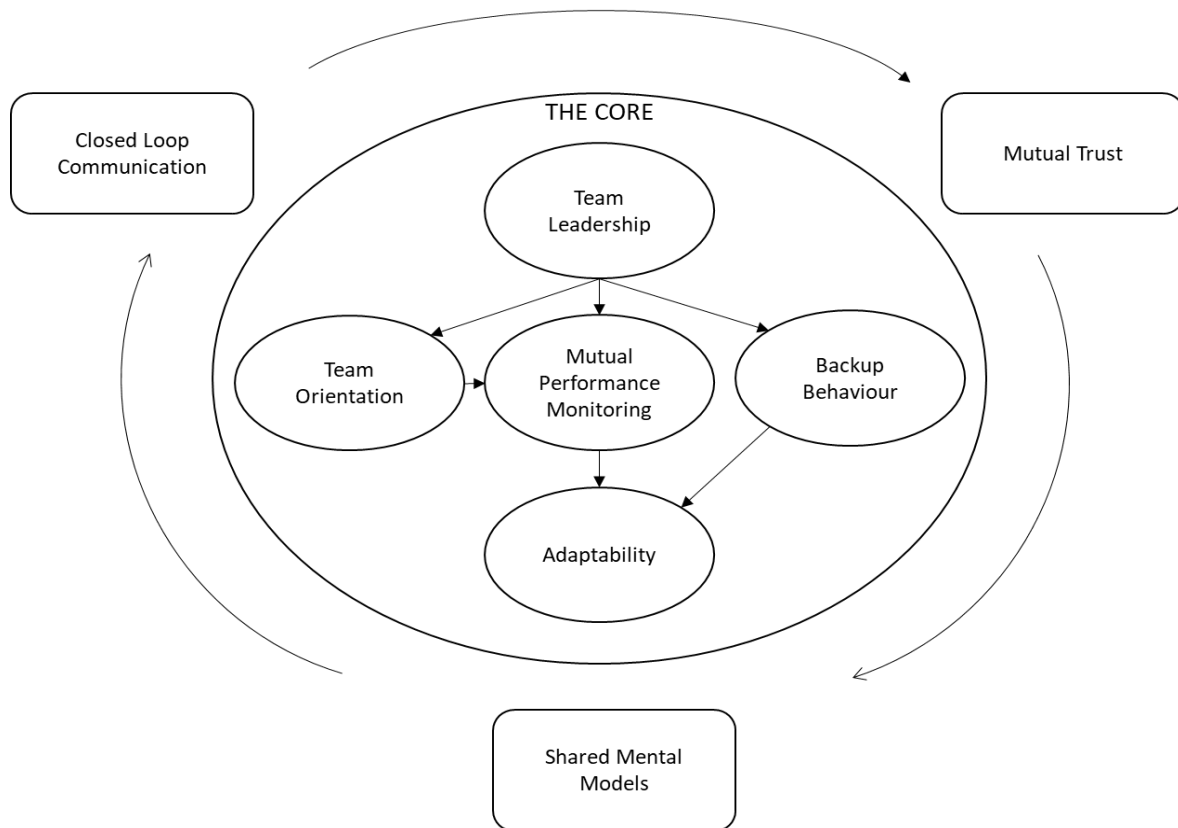


Figure 1.3. The Big Five and Coordinating Mechanisms (Salas et al., 2005)

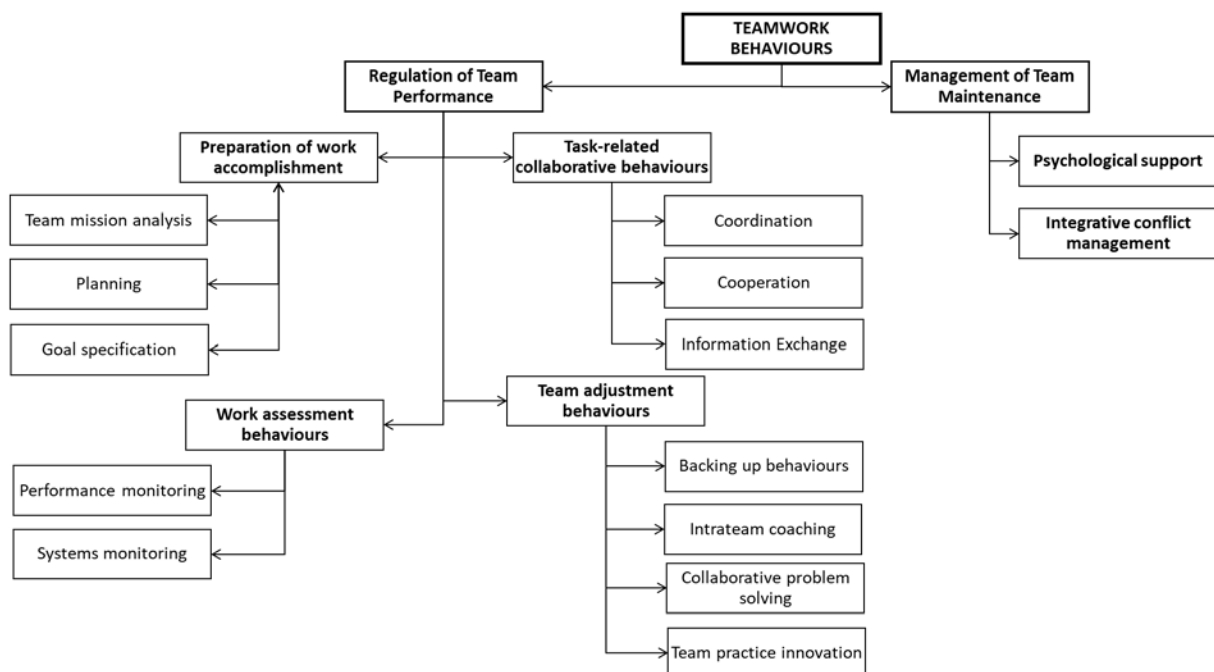


Figure 1.4. Schematic Representation of the Hierarchical Conceptual Structure of Teamwork Behaviours (Rousseau et al., 2006)

Team functioning in sport

Although not organised in conceptual frameworks, or operationalised as multidimensional, there is decades of research that provides evidence for a number of variables associated with team effectiveness in sport. The primary variables that have been found to be positively associated with team performance in sport, whilst also making notable contributions to the wider group dynamics literature, are cohesion, collective efficacy, and leadership (Kleinert et al., 2012).

Cohesion; the strength of social and task related bonds among team members (Carron & Eys, 2012), has historically been regarded as the most important group variable in sport teams (Carron, Brawley, & Widmeyer, 2002). Research has demonstrated numerous links between cohesion and other salient group-related variables such as intention to return to a team (Spink, Wilson, & Odnokon, 2010), and collective efficacy (e.g., Leo, Gonzalez-Ponce, Sanchez-Miguel, Ivarsson, & Garcia-Calvo, 2015), whilst declining levels of cohesion have been cited as a potential antecedent to group conflict and/or the development of cliques (Paradis, Carron, & Martin, 2014a). Most significantly though, meta-analytic results provide robust evidence of a significant, positive relationship between cohesion and team performance ($ES = .65$, Carron, Colman, Wheeler, & Stevens, 2002; $r = 0.34$, Filho, Dobersek, Gershgoren, Becker, & Tenenbaum, 2014); a relationship that held regardless of the type of cohesion (i.e., task vs. social cohesion), type of sport (i.e., team vs. individual sports), or direction of the relationship (i.e., cohesion leading to performance, or vice versa). One finding of note was that the strength of the cohesion-performance relationship was stronger for females than males (Carron et al., 2002). A recent qualitative study explored this finding in greater detail, providing evidence to suggest that there may be gender differences

inherent in sports teams, which may influence the development of cohesion, creation of cliques, and the management of conflict (Eys et al., 2015).

Collective efficacy denotes a group's shared belief in their ability to achieve given levels of attainment (Bandura, 1997). The concept has been linked to a number of favourable outcomes such as exerting more effort and persisting for longer (e.g. Greenlees, Graydon, & Maynard, 1999), team cohesion (e.g. Leo et al., 2015; Fransen, Decroos, Vande Broek, & Boen, 2016), and performance (e.g., Myers, Feltz, & Short, 2004). More recently, research attention has shifted towards a concept of team confidence which encapsulates collective efficacy as a process-oriented type of confidence (i.e., confidence to accomplish a certain task such as adapting to changing opposition tactics), but also includes team outcome confidence (i.e., confidence that your team has the abilities to win the game; Fransen, Mertens, Feltz, & Boen, 2017). Athletes who report higher levels of team outcome confidence have been found to perform better (Fransen, Decroos et al., 2015; Fransen, Steffens et al., 2016), suggesting that both types of team confidence are important predictors for a team's functioning (Fransen et al., 2017). One of the most important sources of team confidence is confident leadership provided by both coach and athlete leaders (Fransen, Haslam et al., 2015).

The significant influence of athlete leaders on team functioning is emerging as a prominent theme in the developing group dynamic literature in sport (cf. Cotterill & Fransen, 2016). Although leadership represents one of the most heavily researched group dynamic constructs in sport (Kleinert et al., 2012), the majority of the extant research has focused on the role of the coach/manager. Leaders in these positions who embody the central tenets of transformational leadership have been found to produce higher performing teams and individuals (Charbonneau, Barling, & Kelloway, 2001; Bormann, Schult-Coerne, Diebig, & Rowold, 2016), and teams with greater levels of cohesion (Callow, Smith, Hardy, Arthur, &

Hardy, 2009). Peer leaders who exhibit transformational qualities have also been associated with greater levels of team cohesion and collective efficacy (Price & Weiss, 2011), and more recent research suggests that athlete leadership is a crucial part of sport team functioning (Cotterill & Fransen, 2016). Effective athlete leadership has been found to have a positive effect on a range of group-related factors such as team confidence (Fransen, Coffee, et al., 2014; Fransen, Haslam et al., 2015; Fransen, Decroos et al., 2016), team resilience (Morgan, Fletcher, & Sarkar, 2013, 2015) and team effectiveness (Fransen et al., 2017).

Interestingly, there is an increased focus on informal leaders (as opposed to formally appointed leaders such as the team captain) who are thought to have significant power and influence within a group (Loughead & Hardy, 2005). Indeed, research with a large sample of team sport athletes revealed that informal leaders, rather than captains, were perceived as the best leaders in most teams (Fransen, Vanbeselaere, et al., 2014). Moreover, the number of leaders that fulfilled differing leadership roles (i.e., task, motivational, social, and external leadership) within a team was positively correlated with team confidence, team identification, and higher team ranking. The application of social network analysis to the investigation of leadership structure in sports teams found that captain and coach tended to be rated higher on their external and task-related leadership qualities, whereas informal athlete leaders were generally perceived as the best leaders within social and motivational roles (Fransen, Van Puyenbroeck, et al., 2015). Overall, athlete leaders were perceived to be the best all-round leaders in most teams. Therefore, it is apparent that sports teams are complex social systems characterised by shared leadership; the coach, captain, and informal athlete leaders occupy divergent leadership roles to lead their team together (Cotterill & Fransen, 2016).

Although cohesion, collective efficacy and leadership represent the most widely researched group dynamic constructs in sport, the body of literature related to sports teams is

burgeoning. For example, the recent development of the Group Conflict Questionnaire for sport (Paradis, Carron, & Martin, 2014b) provides an opportunity to advance knowledge and understanding of the impact of intragroup conflict on team effectiveness. Similarly, the research undertaken by Morgan and colleagues offers valuable insight into the construct of team resilience, and the characteristics required for a team to respond positively to stressors collectively encountered (Morgan et al., 2013, 2015). Utilisation of the Resilience in Sports Teams Inventory (Decroos et al., 2017) should hopefully garner further information on how team resilience is related to other group-related constructs, and how it develops over time.

Despite the lack of a single, agreed-upon, framework of team effectiveness in organisational psychology, there is unanimous recognition that team functioning is multidimensional; variables combine to influence team performance. Contributing factors influence one another in a variety of ways, thus should be considered holistically, rather than in isolation (Salas, Shuffler, Thayer, Bedwell, & Lazzara, 2015). Unfortunately, the same cannot be said for the vast majority of research on team effectiveness in sport, which has a tendency to investigate group-related constructs in isolation. To the author's knowledge there have been only two studies that have attempted to investigate the influence of multiple group-related constructs on team outcomes. Filho, Tenenbaum, and Yang (2015) provided initial evidence regarding an integrated framework of team dynamics in sport, finding that TMMs and collective efficacy had a direct impact on perceived performance potential. Within this framework cohesion served as an antecedent of both TMMs and collective efficacy. Whilst the application of structural equation modelling to the analysis of multiple constituents of team functioning represents an important methodological advance, a number of variables with strong empirical associations with team effectiveness (e.g., leadership) were not included within the framework. Furthermore, the failure to report any relationship between

the studied variables and objective performance limits the extent to which conclusions can be drawn about the impact of the proposed framework on overall team effectiveness.

More recent research by Leo et al. (2015) responded to a number of criticisms commonly directed at team-related research (cf. McEwan & Beauchamp, 2014); namely that the predominant use of cross-sectional designs fails to capture the dynamic nature of teams, nor do traditional methods of analysis account for the multiple layers that exert their influence on team dynamics. Therefore, Leo and colleagues utilised a longitudinal design with multilevel analyses to examine the predictive validity of role ambiguity, role conflict, team conflict, and team cohesion on collective efficacy. Results indicated that the group processes of team conflict and cohesion, at the interpersonal and interteam levels, could explain the fluctuations in collective efficacy over the course of a competitive season, thus providing evidence of the interrelated and dynamic nature of these variables. However, individual perceptions (i.e., those pertaining to roles) were not relevant in the prediction of team confidence. This study makes a valuable contribution to the literature, yet considers only a limited number of variables, and does not provide insight into the influence of these factors on team performance and effectiveness.

McEwan and Beauchamp's (2014) conceptualisation of team effectiveness in sport, whilst not based on sport specific data, represents the most comprehensive attempt to assimilate the group dynamics literature (see Figure 1.5). This framework borrows largely from those put forward by Rousseau et al. (2006) and Mathieu et al. (2008; see Figures 1.2 & 1.4). Mediating variables, referred to as *teamwork*, form the focal part of this model, and are classified as either contributing to the management of team maintenance (i.e., psychological support, conflict management), the regulation of team performance (i.e., preparation, execution, evaluation, and adjustment processes), or emergent states (i.e., cohesion, collective efficacy).

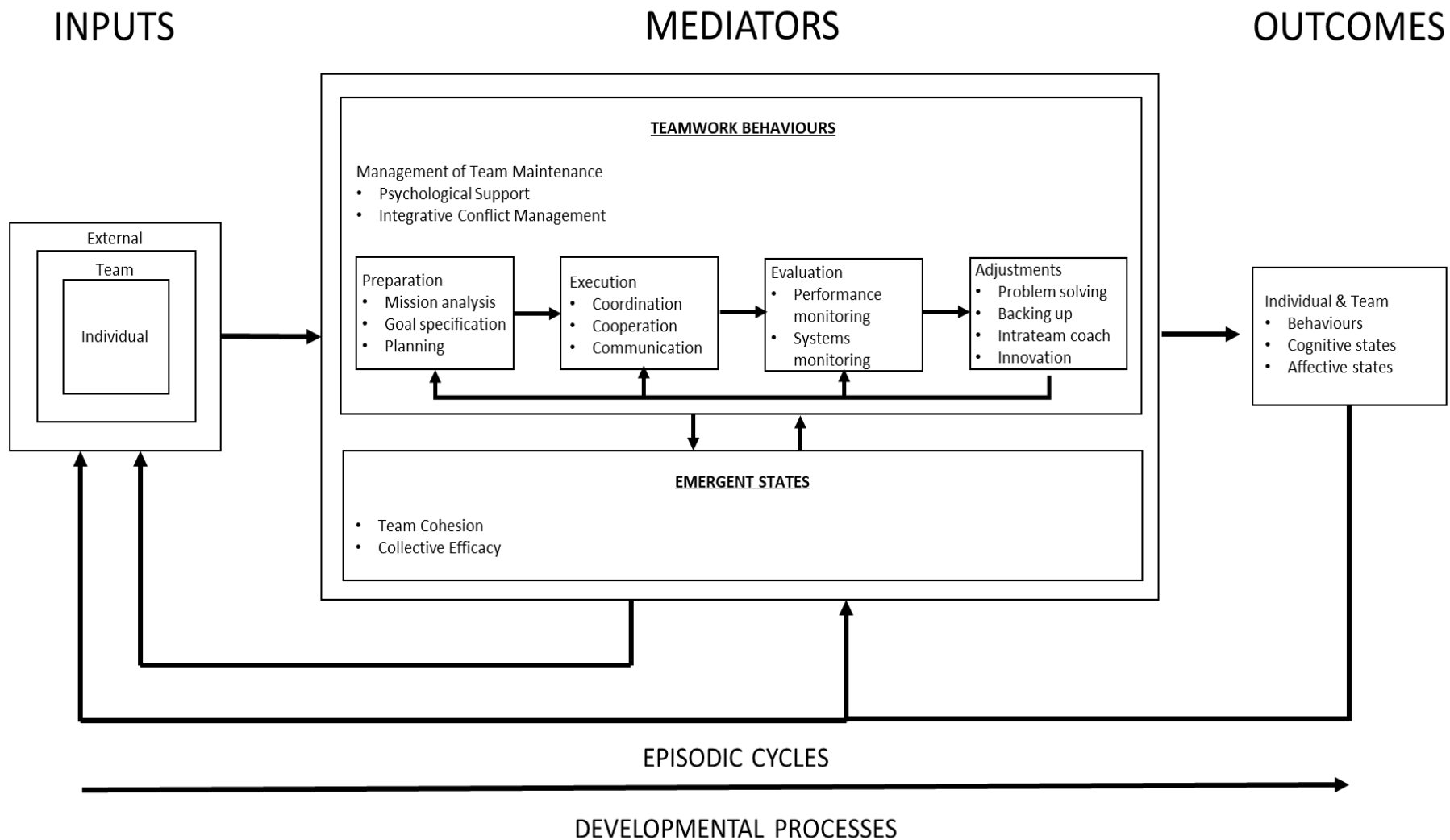


Figure 1.5. Conceptual framework for teamwork and team effectiveness in sport (McEwan & Beauchamp, 2014)

The model addresses aforementioned limitations of traditional IPO models by representing the nested nature of team inputs, describing the collection of processes and emergent states as mediators, and noting the prominence of certain mediating variables at various times in team performance cycles. However, whilst there is some evidence to support the importance of a number of the presented constructs in sport, many have only been studied at the individual level, whereas others are only anecdotally related to team effectiveness (e.g., backing up behaviours).

Furthermore, the adoption of terminology coined in the organisational domain presents concepts unrecognisable in sport, and somewhat precludes the practical application of the framework with athletes and coaches. For example, the term ‘systems monitoring’ to describe the process of tracking environmental conditions that are related to task accomplishment (Marks et al., 2001) would mean little to those involved in professional sport. There is an argument, therefore, that the development of frameworks of team effectiveness in sport require an understanding of the team-referent language adopted by players, coaches and performance directors.

Measurement

Team functioning. Given the richness of the team effectiveness literature accumulated over the past century, there is no single unifying theory of the exact dimensions of teamwork, nor is there any agreement on those variables of greatest import. Consequently, associated measures are correspondingly diverse (Valentine, Nembhard, & Edmondson, 2015). Instruments either capture a broad understanding of team functioning through a comprehensive collection of behavioural measures (e.g., Hoegl & Gemuenden, 2001), or test more specific processes/emergent states (e.g., trust; Costa, 2000). A number of reviews provide evidence of countless scholar-developed instruments designed to measure the

functioning and efficiency of teams (e.g., Brennan, Bosch, Buchan, & Green, 2013; Marlow, Bisbey, Lacerenza, & Salas, 2018; Valentine et al., 2015). These measures generally focus on the variables of interest to the scholars who devise them, are often lengthy, and fail to generate any team diagnosis (Wageman, Hackman, & Lehman, 2005). Conversely, consultant-developed instruments (e.g., Cornelius Associates, 2004; Reliable Surveys Online, 2005) have far greater face validity, and provide a diagnosis of team dynamics, feeding back informative results to teams and their leaders. However, consultant-developed measures are infrequently based on established research and theory, lack scientific robustness, and the factors assessed are not necessarily those that are most significant for performance (Wageman et al., 2005).

Instruments intended for use in the improvement of teams should focus on the variables known to influence performance, provide diagnostic information, whilst also demonstrating reasonable psychometric properties to ensure accuracy of the measure. To achieve these aims, and address the aforementioned shortcomings, Wageman and colleagues developed a Team Diagnostic Survey (TDS), designed to be used in scholarly research and practical diagnosis of team's strengths and weaknesses. The TDS was explicitly based on a conceptual model of the factors empirically found to be the most consequential for team effectiveness. Furthermore, the TDS can be completed within 20 minutes and has adequate psychometric properties. Whilst an instrument such as the TDS offers much promise in the development of teams, the measure assesses very few of the mediating variables commonly referred to as teamwork.

Team effectiveness. If team effectiveness is the outcome of teamwork or team functioning, it seems pertinent to consider exactly what constitutes an effective team. The most salient and valued indicator of team effectiveness is the objective assessment of team performance (Kozlowski et al., 2015). However, performance measures overlook indicators

of how well a team is working together (Wageman et al., 2005), and provide little practical information for improving team effectiveness (Pedersen & Cooke, 2006). Although the outcome side of the team effectiveness framework is the least well specified (Mathieu et al., 2008), a broad approach to effectiveness is common in extant research in both organisations (Cohen & Bailey, 1997; Guzzo & Dickson, 1996), and sport (McEwan & Beauchamp, 2014). This approach includes the multiplicity of outcomes that matter to a team; performance outputs or behaviours (Beal et al., 2003), cognitive states (e.g. efficacy; McEwan & Beauchamp, 2014), or affective states (e.g. satisfaction; Cohen & Bailey, 1997). Indeed, the effectiveness criteria of the TDS includes measures of task performance, quality of group process, and member satisfaction (Wageman et al. 2005).

Although most research has featured tangible outputs and member reactions as indices of effectiveness, Mathieu et al. (2017, p. 455) contend that “there is not a standard set of criteria measures for team research- nor should there be”. The importance and relevance of outcomes should be specific to the context in which they are assessed.

Measurement in sport. As our understanding of team functioning in sport is rudimentary, it is unsurprising that there have been no published attempts to measure this multidimensional construct (Carron et al., 2012). However, given McEwan and Beauchamp’s (2014) recent addition to the literature, there is a pressing need for the development of psychometrically sound assessment procedures for use with sport teams (Beauchamp, McEwan, & Waldhauser, 2017). Despite a lack of instruments assessing the various components that influence team functioning and effectiveness in concert, there are many valid and reliable measures which assess specific group-dynamic variables. For example, the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) assesses team members’ perceptions of team cohesion. Widely utilised and cited well over 1000 times,

the GEQ has demonstrated numerous links between athletes' perceptions of cohesion and meaningful group dynamics variables (cf. Burke, Davies, & Carron, 2014). There is also a catalogue of studies utilising relevant measures of collective efficacy (e.g., Short, Sullivan, & Feltz, 2005; Fransen, Kleinert, Dithurbide, Vanbeselaere, & Boen, 2014) and leadership (Chelladurai & Saleh, 1978; Callow et al., 2009), whilst the Group Conflict Questionnaire (Paradis et al., 2014b) and Resilience in Sports Team Inventory (Decroos et al., 2017) represent recent, welcomed additions to the team-related literature in sport.

Team Development

The application of knowledge of the factors that are most relevant for team performance, combined with the adoption of sound psychometric instruments, facilitates the development and improvement of team functioning and effectiveness (Ohlert & Zepp, 2016). Well-designed team development interventions are recognised within both the sport and organisational literature as key mechanisms by which to facilitate performance (Beauchamp et al., 2017; Cannon-Bowers & Bowers, 2010).

Team development interventions generally fall within the categories of either team building or team training. Although both team building and team training are intended to enhance team functioning and effectiveness, they are not synonymous. Team building encompasses a range of strategies designed to improve interpersonal relations and social interactions (Klein et al., 2009), often serving to develop emergent states such as cohesion and trust (Weaver, Dy, & Rosen, 2014). Common team building strategies in organisational psychology include goal setting, interpersonal relationship management, role clarification, and problem solving (Buller & Bell, 1986). A review of the evidence found that, across 20 studies, all four team building approaches had a moderate effect on team outcomes, with goal setting and role clarification being the strongest (Klein et al., 2009). Goal-setting directs team members' attention to specific, purposeful actions, which can improve motivation and

positively impact team outcomes (e.g., Locke & Latham, 2006). The clarification of team member roles can serve to increase an individual's efficacy in their ability to complete the role, which in turn has a positive effect on performance (Bray & Brawley, 2002).

Team training, on the other hand, represents a more formal, structured approach to developing the skills that underlie effective teamwork behaviours such as communication and coordination (Klein et al., 2009). Specifically, team training aims to enhance understanding of the skills required for effective team performances, provides opportunities to practice these skills, and offers feedback regarding their use and application (Shuffler, DiazGranados, & Salas, 2011). Specific strategies found to have the most significant effect on performance include guided team self-correction and team coordination and adaptability training (Salas, Nichols, & Driskell, 2007). Self-correction training develops a team's ability to recognise and solve teamwork breakdowns, targeting processes such as mutual performance monitoring and effective communication (e.g., Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008). Team coordination training facilitates an understanding of issues related to the achievement of shared goals, employing teamwork skills such as backup behaviour (e.g., Entin & Serfaty, 1999). Overall, team training has been found to have a moderate, positive effect on team functioning (Salas et al., 2008), positively influencing cognitive, affective, and process outcomes, as well as team performance. Furthermore, a recent meta-analysis provides additional support for the efficacy of team training, finding a positive and significant medium-sized effect for training interventions on both teamwork and performance (McEwan, Ruissen, Eys, Zumbo, & Beauchamp, 2017). Taken collectively, the evidence suggests that team training works across a range of samples and utilises various intervention methods.

Team building in sport. The science of team development has also been applied successfully to the improvement of sports teams. Interventions employed have included

outdoor pursuits (e.g., Martin & Davids, 1995), team goal setting programmes (e.g., Senecal, Loughead, & Bloom, 2008), personality preference-based interventions designed to improve understanding of self and others (e.g., Beauchamp, Lothian, & Timson, 2008), and personal disclosure mutual sharing sessions which foster enhanced interaction and understanding amongst team members (e.g., Dunn & Holt, 2004; Holt & Dunn, 2006). Despite these varied approaches, the literature, to date, has been heavily influenced by a predominant focus on team building as a means to improve team cohesion (Beauchamp et al., 2017). Indeed, results of a recent citation analysis (Bruner, Eys, Beauchamp, & Cote, 2013) suggest that team building in sport has been largely informed by a singular emphasis on cohesion, overlooking much of the informative literature available in organisational psychology, and the multitude of other variables that may impact team effectiveness (Bruner et al., 2013). Although meta-analytic results provide evidence of a moderate, positive effect of team building approaches on team performance, the findings fail to provide evidence of any significant effect of team building on cohesion (Martin, Carron, & Burke, 2009). Martin and colleagues suggest that this could be explained by the variety of measures used to assess cohesion, however other researchers argue that greater examination of the mechanistic pathways of team building approaches on performance is warranted (e.g., Beauchamp et al., 2017). Evidently, team performance is improved by numerous other variables that do more than make a team feel more united, and future research should explore these in greater detail.

Beauchamp et al. (2017) argue that researchers in sport need to move beyond cohesion to focus instead on the development of teamwork. More than just building cohesion, the improvement of teamwork requires an understanding of the salient knowledge, skills, and attitudes required for effective team performance; the application of sound psychometric instruments to assess how teams are doing; and the provision of feedback to diagnose team strengths and areas for improvement (Salas, Rosen, Burke, & Goodwin, 2009).

Thesis Rationale

Over 100 years of research has been conducted on teams across social and organisational psychology (cf. Kozlowski, 2018; Mathieu et al., 2017). However, given the relative infancy of sport psychology, our understanding of what effective teams *do* in sport is comparatively limited. Although the team-related literature is burgeoning, it is doing so in a somewhat unidimensional manner. That is, researchers are investigating variables associated with team functioning and effectiveness in isolation, overlooking the multidimensional nature of team effectiveness widely accepted in organisational psychology, and precluding knowledge of how the various influencing factors work in concert. Currently, McEwan and Beauchamp (2014) offer the only comprehensive, multidimensional conceptualisation of team effectiveness in sport. Whilst the model offers some much-needed theoretical insight into the concept of teamwork in sport, the concepts adopted borrow heavily from organisational psychology, with little empirical evidence to support the significance of these constructs within sports teams (e.g., performance monitoring, systems monitoring). It has been argued that such deductively developed frameworks provide very little applied information (Collins & Durand-Bush, 2015). In order to provide more context specific guidance researchers need to study teams “in the wild” (Salas et al., 2008, p. 544) to understand the processes necessary for optimal functioning in a particular context (Collins & Durand-Bush, 2015). Therefore, this thesis adopted a bottom-up (inductive) approach to develop an evidence-based framework of team functioning based on the experiences of those involved in professional cricket. Table 1.1 below provides details on the overall structure of the program of work conducted as part of this PhD thesis.

The multidimensional nature of both team functioning and effectiveness presents an inherent challenge in the development and utilisation of appropriate measures. Arguably, when studying teams in context, the use of multi-item psychometric scales is infeasible.

Having team members complete lengthy survey instruments is a laborious task, and precludes the collection of substantive variables, or repeated administration (Mathieu et al., 2017). In response to this limitation, and the lack of an appropriate measure of team effectiveness available in sport, we adopted a new paradigm to design and validate a multi-construct, single-item based inventory to assess and diagnose team functioning in professional cricket (Inventory of Essential Team Ingredients; IETI). Furthermore, there is currently limited understanding of the relative unique contributions of different processes and states to the prediction of team outcomes (Mathieu et al., 2017). Therefore, we used the measure developed to profile more and less effective cricket teams and employed pattern recognition analysis to elicit valuable practical information regarding the relative importance of the various features of team functioning. When devising the outcome criteria that would be used to classify effective and less effective teams we considered it important to move away from a reliance on self-report data (cf. Connors, Rende, & Colton, 2016), thus included an outcome that was informant-rated by individuals that had played against the team in question.

The final study within this thesis responds to a recent call for research to develop and evaluate team interventions in sport which are informed by evidence-based approaches (Beauchamp et al., 2017). Within organisational psychology team development training remains theory heavy and data light (Kozlowski, 2018), whilst within sport there is a distinct paucity of experimental/intervention-based research targeting team-related variables other than cohesion (Beauchamp et al., 2017). To this end, we implemented recommendations proffered by Ohlert and Zepp (2016) to design and deliver a theory-based, bespoke team building intervention with an elite female cricket team.

Given the focus of the research on the highest level of cricket in the UK, there was a finite pool of participants from which to sample for the empirical research chapters. Therefore,

a number of participants were sampled in more than one empirical chapter in the thesis. Specifically, one player, two coaches, and three psychologists participated in the interviews in Chapter 2 and also rated the content validity of the IETI in Chapter 3. However, none of the participants that rated the content validity participated in the second study within Chapter 3 (i.e., those in study two of Chapter 3 had not seen the IETI previously). One player and one coach who had participated in the interviews in Chapter 2 completed the IETI on behalf of their team in study two of Chapter 3. Finally, the coach and captain of the team studied in Chapter 4 had participated in the interviews in Chapter 2. It was important, in all empirical chapters, for participants to have a good understanding of the Essential Team Ingredients (ETI) model and its constituent parts, as this enabled a more informed completion of the IETI. Therefore, there should not have been any adverse consequences of sampling the same participants in more than one study. Only one participant was sampled in all three empirical chapters, and as head coach of the case studied team in Chapter 4, it was critical for this participant to have a detailed understanding of the research and the ETI model, as she was responsible for delivering the intervention.

Table 1.1. Overview of the PhD program of work

	Chapter 2	Chapter 3 - Study 1	Chapter 3 - Study 2	Chapter 4
Purpose	To gain a greater understanding of the multidimensional nature of team functioning and provide a novel conceptualisation of the most important factors for team effectiveness in professional cricket.	To develop and validate a measure of teamwork (Inventory of Essential Team Ingredients; IETI) and team effectiveness contextualised to cricket teams.	To assess the inter-rater reliability and predictive validity of the IETI and investigate the relationship between variables within the IETI and team effectiveness.	To design, deliver, and evaluate a teambuilding intervention based on results from the IETI in professional cricket.
Methodology	Qualitative: abductive method of enquiry through interviews with participants.	Quantitative (+ qualitative responses providing feedback for item improvement).	Quantitative	Mixed-methods: Quantitative application of IETI Qualitative focus groups
Sample	21 cricket experts (female $n = 6$, male $n = 15$, $M_{age} = 36.05$ years, $SD = 8.67$) including 7 players, 7 coaches, 2 managers, and 5 psychologists with national and international cricket experience.	18 cricket experts (male $n = 11$, female $n = 7$; $M_{age} = 34.22$, $SD = 11.24$) including 6 professional cricket coaches, 6 elite players, and 6 sport psychologists with national and international cricket experience.	32 UK County cricket teams (female $n = 16$, male $n = 16$) resulting in a total of 92 participants (coach $n = 61$, player $n = 31$).	One elite female cricket team: 15 players ($M_{age} = 23.87$, $SD = 3.96$) and 8 staff (female $n = 5$, male $n = 3$, $M_{age} = 29.00$, $SD = 6.38$).
Analysis	Abductive analysis	Univariate ANOVA to assess differences across coach, psychologist, and player ratings. Calculation of validity V coefficients	Pattern recognition analysis	Visual inspection of quantitative data. Deductive thematic analysis of qualitative data.
Timeframe	Length of study (from commencement to publication): 36 months Length of data collection: 9 months	Length of study (from commencement to manuscript): 16 months Length of data collection: 4 months	Length of study (from commencement to manuscript): 16 months Length of data collection: 5 months	Length of study (from commencement to manuscript): 11 months Length of data collection: 4 months

Chapter 2

Big hitters: Important factors contributing to team effectiveness in professional cricket.

Abstract

While organisational psychology attests to the multidimensional nature of team effectiveness, insight regarding the most important factors contributing to the effectiveness of sports teams, especially elite teams, is lacking. An abductive method of qualitative enquiry was adopted to capture participants' construal of team effectiveness, drawing on the extant literature in both sport and organisational psychology. Semi-structured interviews were conducted with 21 players, coaches, and psychologists involved in elite cricket, with resultant data analysed inductively initially, before being reanalysed deductively. Although the narratives endorsed the value of many of the deductively derived factors, other constructs more prominent in organisational psychology (e.g., trust and intra-group conflict) appeared to be *more* important than traditional sport psychology group factors. The results revealed six broad themes; culture and environment, values, communication, understanding, leadership, and unique individuals, with some gender differences apparent throughout. Based on our elite sample's construal of team effectiveness, we propose a new model representing a practical, parsimonious, and novel conceptualisation of the most important attributes of team effectiveness in cricket, with conceivable transferability to other team sports.

Sport is littered with examples of team performances that exceed the sum of their parts (e.g., the Welsh and Icelandic soccer teams' performances in the 2016 European Championships) and such events pique the interest of practitioners and researchers alike. Although a number of related group dynamic terms have been used synonymously within the sport and organisational literature, there is merit in distinguishing between team functioning, team performance, and team effectiveness. Team functioning refers to the relevant knowledge, skills, and abilities (KSAs) required for a group to achieve its outcomes (Rico, de la Hera, & Taberno, 2011). The collection of KSAs, often referred to as teamwork, operate dynamically and simultaneously (Salas, Stagl, Burke, & Goodwin, 2007). Despite the extant research literature having a predominant focus on teamwork, we adopt the term team functioning in the present research to more accurately account for all variables (as opposed to an exclusive focus on processes; cf. Rousseau, Aubé, & Savoie, 2006) that enable a team to work together effectively. Team performance and team effectiveness are consequences of team functioning. Within professional sport the most valued consequence is the outcome of the team's performance (i.e., a win or a loss; Kozlowski, Grand, Baard, & Pearce, 2015); however, team performance metrics (e.g., win/loss ratio) fail to account for the *way* in which teams achieve their outcomes. For instance, in the sport of cricket, characterised by segregated interdependence (where members are not always required to interact with one another; Evans, Eys, & Bruner, 2012), a team can produce a winning performance due largely to the isolated actions of a single individual. Alternatively, team effectiveness refers to a more holistic perspective embodying whether a team has achieved its performance oriented outcome (i.e., a win) as well as *how* the team interacts to achieve said outcome (Salas, Sims, & Burke, 2005). Thus, a high functioning team is likely to be highly effective. Given that this holistic perspective is rare in the sport psychology literature, the present study explored how

teams interact and function in order to form a greater appreciation of what contributes to the making of effective teams in cricket.

Unsurprisingly, the study of group dynamics has been a stalwart feature of the sport psychology literature and there is an ever-growing body of research endorsing positive associations between a large number of group-related variables and team outcomes (Kleinert et al., 2012). In fact, sports research has made a notable contribution to the wider literatures on cohesion (e.g., Carron, Widmeyer, Brawley, 1985), team roles (e.g., Eys, Beauchamp, & Bray, 2006), and leadership (e.g., Chelladurai, 1990). While it would not be possible to do justice to this mass of research within any single literature review, Table 2.1 identifies the prominent group factors (e.g., collective efficacy, communication, roles perceptions) that have been examined within the context of sport and gives a flavour of the extent and nature of the findings reported. Although this research provides a solid foundation for knowledge, there are some general limitations that have direct bearing on the present study. First, there has been an over reliance on the examination of interdependent sport teams (e.g., basketball, hockey) at the expense of less interdependent sport teams (e.g., baseball, cricket; Evans et al., 2012). Second, while there is some evidence that group constructs vary across context and culture (e.g., Eys et al., 2015), the use of convenience sampling from teams competing at the university level is overly dominant in comparison to professional or international sports teams. Several meta-analyses in sport attest to the overreliance on sampling from both interdependent (interactive) teams and those competing at the university level (Carron, Colman, Wheeler, & Stevens, 2002; Martin, Carron, & Burke, 2009; Filho Dobersek, Gershgoren, Becker, & Tenenbaum, 2014). Third, the vast majority of this research has investigated variables such as cohesion and leadership in isolation, thereby precluding knowledge of how the numerous factors that contribute to team effectiveness operate in concert as well as which specific factors are most influential (e.g., Filho et al., 2014).

Table 2.1. Summarised literature review of factors with potential relevance for team effectiveness in cricket

Concept	Working definition	Theoretical references	Empirical support	Meta-analysis in sport	Meta-analysis in org.	Relationship with group outcomes
Adaptability	How well a team can recognise a change from what was expected and alter their actions and behaviours to still achieve the same shared goals.	Burke, Stagl, Salas, Pierce, & Kendall (2006); Priest, Burke, Munim, & Salas (2002)	Entin & Serfaty (1999); Wiedow & Konradt (2010)	X	✓ (meta-analysis of team processes; LePine et al., 2008)	Positive relationship with performance. Positive relationship with communication under stress. Positive relationship with coordination.
Cohesion	The extent to which a team comes together and stays together to achieve their shared goals; The extent to which a team comes together socially, away from the sport.	Carron et al. (1985); Pescosolido & Saavedra (2012)	Beal et al. (2003)*; Carron, Colman, Wheeler, & Stevens (2002)*; Dobersek, Gershgoren, Becker, & Tenenbaum, (2014)*	✓	✓	Positive, bi-directional relationship with performance. Positive relationship with viability & collective efficacy.
Communication	The verbal or non-verbal exchange of information between individuals.	Pentland (2013); Sullivan & Feltz (2003)	LeCouteur & Feo (2011); Mesmer-Magnus & DeChurch (2009)*	X	Information sharing ✓	Positive correlation with cohesion. Positive relationship with performance.

Conflict	Disagreements between team members that may be accompanied by negative emotions and/or interference with the attainment of the group's goals.	Jehn (1995); Paradis, Carron, & Martin (2014a, 2014b)	De Dreu & Weingart, (2003)*; de Wit, Greer, & Jehn, (2012)*; O'Neill, Allen, & Hastings, (2013)* Wachsmuth, Jowett, & Harwood (2016)	X	✓	Negative relationship between conflict and member satisfaction and commitment. Positive relationship between task conflict and performance under certain circumstances. Conflict management positively related to team performance.
Coordination	Organisation and integration of members' actions to work toward a shared goal.	Eccles (2010); Gorman (2014)	Bourbousson, Poizat, Saury, & Seve (2012); LePine et al. (2008)*	X	✓ (meta-analysis of team processes; LePine et al., 2008)	Coordination mediates the relationship between TMMs & performance. Positive relationship with team member satisfaction and team performance.
Collective efficacy	The level of shared belief a team has in its collective abilities to achieve shared goals and expected levels of performance.	Bandura (1997); Fransen, Kleinert, Dithurbide, Vanbeselaere, & Boen (2014)	Gully, Incalcaterra, Joshi, & Beubien (2002)*; Fransen, Decroos, et al. (2015); Stajkovic et al. (2009)*	X	✓	Positive relationship with performance Reciprocal relationship with performance in sport. Positive relationship with cohesion and TMMs.
Leadership	The behaviour of an individual when directing the activities of a team towards achieving their shared goals.	Bass (1985); Chelladurai (1990); Zaccaro, Rittman, & Marks (2001)	Burke et al. (2006)*; Callow et al. (2009)	X	✓	Positive relationship between transformational leadership and performance, cohesion, and collective efficacy. Task and person focused behaviours both related to team effectiveness.
Goal setting and planning	The way in which a team lays out how they will achieve their shared goals.	Marks et al. (2001); Weldon & Weingart (1993)	DeChurch & Haas (2008); Stout, Cannon-Bowers, Salas, & Milanovich (1999)	✓ (meta-analysis of team building interventions;	✓ (meta-analysis of team processes;	Positive relationship between planning and use of TMMs, which in turn improves coordinated performance.

				Martin et al. 2009)	LePine et al., 2008)	Direct positive relationship between planning and performance Goal setting interventions positively related to range of outcomes (cohesion & performance).
Resilience	The process by which a team positively and effectively adapts to stressful and adverse events.	Morgan, Fletcher, & Sarkar (2013); Sharma & Sharma (2016)	West, Patera, & Carsten (2009)	X	X	Team resilience positively related to team cohesion, cooperation, and trust.
Roles	The behaviours expected of an individual holding a certain position (those prescribed by the organisation, and those that evolve naturally).	Eys et al. (2006); Kahn, Wolfe, Quinn, Snoek, & Rosenthal (1964)	Beauchamp, Bray, Eys & Carron (2002); Tubre & Collins (2000)*	X	✓	Role ambiguity negatively related to task cohesion and performance. Role acceptance positively related to performance. Athletes who exceeded role contribution expectations reported higher perceptions of task cohesion.
Team mental models	Knowledge held by members of the team that enables them to understand the requirements of the task and therefore coordinate their actions	Eccles & Tenenbaum (2004); Cannon-Bowers et al. (1993); Mohammed, Ferzandi, & Hamilton (2010)	Filho, Tenenbaum, & Yang (2015); DeChurch & Mesmer-Magnus (2010)*	X	✓	Positively related to team processes, motivational states, and team performance. Positively related to planning, communication and leadership Predicts collective efficacy and perceived performance potential

Fourth, there continues to be an overemphasis on team cohesion (Collins & Durand Bush, 2015; McEwan & Beauchamp, 2014). Fifth, the vast majority of the research has not been explicitly contextualised within conceptual frameworks of team functioning or effectiveness (nor performance; e.g., Collins & Durand Bush, 2015). Consequently, this large body of constructs and findings is somewhat disconnected and does not offer researchers or practitioners a clear framework for their work.

In contrast, there is a plethora of models on team effectiveness and teamwork within the organisational literature that have the potential to enhance our understanding of team functioning in sport. Specifically, these models seek to identify the innumerable variables that can affect the success and viability of a team (Salas et al., 2005). In an attempt to consolidate this particular literature, Salas et al. (2005) reviewed 138 different frameworks published across two decades to propose a parsimonious set of practically relevant propositions. Leadership, mutual performance monitoring, backup behaviour, adaptability, and team orientation were advanced as the core components, which are themselves transformed and facilitated by three coordinating mechanisms; shared mental models, mutual trust, and closed loop communication. These components appear in many other team effectiveness/teamwork frameworks, and Salas and colleagues make valuable suggestions as to how they can be applied to the development and maintenance of teams. However, the framework *as a whole* has yet to be empirically tested and this is a shortcoming of the organisational literature more generally; models commonly include many factors to represent the complex and multidimensional nature of team effectiveness, but provide little direct empirical evidence to support them.

Encouragingly, one relatively recent addition to the sports literature warrants particular coverage. McEwan and Beauchamp (2014) proposed a model of teamwork and team effectiveness in sport that amalgamated two prominent frameworks from organisational

psychology; Mathieu, Maynard, Rapp, and Gilson's (2008) Input-Mediator-Output team effectiveness framework, and Rousseau et al. (2006) teamwork behaviours framework. As a result, McEwan and Beauchamp's model conforms to the traditional perspective of a team effectiveness "throughput" model whereby mediating attributes convert inputs into outcomes. In particular, these mediators were divided into three classes which contribute to the management of team maintenance (i.e., psychological support and conflict management), the regulation of team performance (i.e., preparation, execution, evaluation, and adjustment processes), and emergent states (i.e., cohesion and collective efficacy). The range of included mediators reflected the importance of cognitive, attitudinal, motivational, and affective states in team effectiveness, as well as the more accepted teamwork processes or behaviours. In addition, McEwan and Beauchamp acknowledged the multidimensional and dynamic nature of teamwork, noting the salience of certain mediating attributes at different times in team performance cycles, thus addressing a common criticism of team effectiveness models that they ignore the temporal experience of teams (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). However, whilst there is some data to support the relevance of a number of the constructs presented in the sport model, many of the constructs have only been studied at the individual level with little examination at the (arguably more meaningful) group level. Furthermore, while maintaining terminology consistent with the organisational domain (cf. Rousseau et al., 2006) might reduce the risk of conceptual misunderstanding, it almost certainly hinders the accessibility of the framework to sport practitioners and coaches, and their athletes. Similarly, in a review of sports oriented team process conceptualisations, Collins and Durand-Bush (2015) noted that despite the proliferation of deductively developed frameworks, applied information was not forthcoming from the available perspectives. They surmised that there is value in 'bottom-up' (inductive) approaches to developing evidence-based

frameworks of team functioning. We concur that such approaches would likely yield new information of importance for teamwork interventions that move beyond team cohesion.

The present research sought to gain a greater understanding of the multidimensional nature of team functioning and provide a novel conceptualisation of the most important factors for team effectiveness in professional cricket. To this end, we drew from the rich sports literature whilst addressing its aforementioned shortcomings, and utilised research from the organisational setting which has largely been ignored. The study also responds to recent calls in the sports literature for more comprehensive theorising with regard to team functioning, and greater collaboration between practitioners and researchers (Kleinert et al., 2012). For instance, it is evident from the existing research that there are many aspects that could be the focus of attention with regard optimal team functioning. However, without knowing which of these aspects have the greatest impact on the effectiveness of different types of team at different times and in different circumstances, the practicality of this literature is limited.

Given that practitioners, especially in professional sport, often have to work “out of sight” of performers, supporting coaching staff, we were also interested in understanding more about the language players, coaches, and performance directors used when discussing their experience of teams. This important applied issue contributed to the comprehensive, complementary, and flexible approach we employed to gain an evidence-based understanding of which attributes contribute to team effectiveness in professional cricket.

Method

Philosophical orientation

In accordance with a relativist epistemology, we adopted the belief that given the dynamic nature of teams, and the number of individuals involved, ‘multiple realities’ of the phenomenon of team functioning would exist (Sparkes & Smith, 2009). Contrary to the

deductive nature of the extant literature regarding team effectiveness frameworks, we were largely interested in uncovering the meaning attributed to team-related experiences by those directly involved (Sparkes & Smith, 2014). More specifically, guided by a constructivist theoretical orientation we recognised that multiple stakeholders contribute to the development of team functioning, and that their construction of this phenomenon would be reflective of their individual roles within a team. To that end, we purposefully sought the perspectives of professional coaches, players, and psychologists on the development of high functioning cricket teams.

Owing to the underdevelopment of the existing sports literature on team effectiveness, yet the proliferation of corresponding literature within organisational psychology the present research involved a succession of inductive and deductive processes; an approach which can be described as abductive (cf. Ryba, Haapanen, Mosek, & Ng, 2012). The aim of the study was to understand the factors that contribute to team effectiveness for players, coaches and psychologists involved in professional cricket (inductive), whilst simultaneously establishing whether participants' experiences could be understood through a number of pertinent group-related constructs (deductive). The abductive approach enables dialectical movement between everyday meanings and theoretical explanations (Sparkes & Smith, 2014).

Participants

After obtaining institutional ethical approval provided by Bangor University School of Sport, Health and Exercise Sciences ethics committee, and individual informed consent, a total of 21 individuals participated in the study. This included seven professional coaches, seven players, two managers, and five applied sport psychologists (6 females and 15 males, $M_{age} = 36.05$ years, $SD = 8.67$) employed by the England and Wales Cricket Board (ECB), or an English First Class County cricket organisation (see Appendix B for details).

Consistent with qualitative methodologies (Patton, 2002) and procedures adopted in related research studies (e.g., Eys et al., 2015), a purposive, criterion sampling approach dictated the recruitment of those with specific knowledge and experience of the phenomena of interest (Sparkes & Smith, 2014). The principle criterion was that coaches and players had been involved in professional First-Class County cricket, or Women's County cricket for at least 10 years; in fact, most were highly experienced within international cricket (M *international experience* = 6.9, SD = 7.73). This ensured that participants had a wealth of experience of high performing teams to draw from through the course of the interviews. Given the relatively recent employment of sport psychology consultants within cricket, no such restrictions were applied to the psychologists, but all worked with an international team (e.g., England senior team). Relevant personnel at the ECB facilitated contact with participants, with interviews then conducted in the early competitive season.

Interview guide

Each interview began with rapport building questions to put participants at ease (e.g., "Can you tell me how you first got involved in cricket?"). Next, participants were asked about their current team in order to focus their attention on aspects of team membership and functioning (e.g., "Tell me a little about the team that you are part of at the moment, what is going on in the team?"). The following section of the interview adopted a predominantly inductive mode of inquiry to explore specific indicators of team functioning (e.g., "Tell me about a team you have been part of which you would say best exemplified teamwork" and "What would you consider to be the most important aspects of teamwork in cricket?"). Many of the variables of interest to the investigation were raised organically within this section of the interview, along with additional attributes not previously considered. Questions were followed up with elaborative probes (e.g., "What contributes to a team working well together?"), or contrast probes (e.g., "What contributes to teams not being able to work well

together?’’), enabling further detail and clarification of the significance of these constructs to team effectiveness and functioning (Patton, 2002).

Given the proliferation of extant literature on team-related constructs, it seemed imprudent not to draw upon variables that had been frequently cited within existing frameworks of team functioning (e.g., adaptability and coordination; Rousseau et al., 2006), extensively researched within sport (e.g., cohesion and roles), or deemed to be relevant and applicable to the particular sport in question (e.g. resilience; Bell, Hardy, & Beattie, 2013). Thus, extensive review of both the sport *and* organisational literatures facilitated the development of a deductive analytical framework of 11 constructs of interest (see Table 2.1). The final section of the interview defined each deductively derived variable in turn before asking participants to comment on their experience of variable in question (e.g., “Resilience can be defined as the process by which a team positively and effectively adapts to stressful and adverse events. Can you describe any situations where your team effectively responded to stressful or adverse events?’’). The use of specific probes explored whether the construct was considered to be relevant to team functioning in cricket, and the circumstances under which it may have a positive or negative influence upon teams.

Seven pilot interviews were conducted to assess the extent to which the interview guide allowed participants to detail their experiences of team effectiveness and adequately capture the specific variables of interest. Minor amendments were made to some of the definitions used in the deductive section of the interview, and more specific probes were added to elicit characteristics of successful teams (see Appendix A for final interview guide). Some of the pilot interviews were particularly lengthy, which highlighted the importance of using specific probes to maintain the focus of questioning.

Data collection and analysis

All but two interviews were conducted in person, with the remainder conducted via telephone to accommodate individuals' demanding schedules. The interviews lasted between 50 and 120 ($M = 79$, $SD = 22.49$) minutes and were audio-recorded and transcribed verbatim, yielding approximately 480 transcript pages (249,442 words). Interviews were transcribed upon their conclusion to enable the first author to gain familiarity with the data and keep a journal of initial observations. The journal was updated following each interview, providing a means by which to explore developing areas of interest, whilst also informing the decision of when we had reached a point of data saturation; when no new themes, findings, concepts or problems were evident in the data (Francis et al., 2010).

Analysis then proceeded in a number of distinct stages. Subsequent to reading each transcript a number of times over, a short summary of developing concepts was completed for each participant. An inductive process of thematic analysis (Braun & Clarke, 2006) was then employed to fracture the data into more manageable meaning units and subsequently identify themes. A 'critical friend' (Sparkes & Smith, 2014) was employed at this juncture to challenge whether the raw themes were accurately represented by the selected meaning units. The data was then reanalysed deductively, through directed content analysis. The goal of directed content analysis is to validate or extend a theoretical framework or theory (Hsieh & Shannon, 2005). Thus, each of the 11 deductively derived constructs of interest were adopted as coding categories and meaning units relevant to their corresponding operational definitions were extracted from the data. This process was initially applied to those deductively-targeted questions in the latter part of the interview before reanalysing entire transcripts with these coding categories in mind. Themes from both inductive and deductive procedures were compared and contrasted, then combined to produce meaningful groupings of the data.

Finally, we conducted a secondary analysis of all themes to examine potential gender and role differences.

Credibility and Trustworthiness

It is increasingly recognised that methods or techniques alone cannot attest to the quality of qualitative research (Sparkes & Smith, 2014). Thus, rather than attempting to adhere to a particular set of criteria to develop trustworthiness and rigor, the present study was guided by elements of Tracy's (2010) 'big-tent' criteria considered most fitting to the purpose of the research. The concurrent application of inductive and deductive methods contributes to the development of *rich rigor* by recognising the scope and context of previous research literature, whilst also allowing for the identification of additional constructs of interest. This, in combination with the collection of rich and abundant data ensured that the complexity and nuances of the data were not missed. The use of data-source and analyst triangulation, alongside respondent validation, also augment the *credibility* of the research. Specifically, the collection of data from three divergent perspectives (coach, player, and psychologist), and the collaboration of all three authors to converge on the final themes and framework represents a process of triangulation which enabled different facets of team functioning to be explored. In addition, participant reflections were sought on both their individual transcripts, the derived themes and final model to ensure a correspondence between researcher findings and the understandings of participants (Tracy, 2010). The result is research that *resonates* with the reader and demonstrates *meaningful coherence* by successfully illustrating individuals' experiences of factors that contribute to team effectiveness.

Results

Consistent themes were evident throughout the interviews that indicated the importance of several core components of team effectiveness in cricket. Although each of the deductively derived candidate constructs were generally endorsed by the participants as

having some relevance to team functioning in cricket, their narratives highlighted several components that they viewed as being *more* important than these traditional group factors. Additionally, the nature of these new components was qualitatively different to, but provided an effective backdrop for acknowledged group process (e.g., coordination) and emergent states (e.g., team mental models; TMM) to develop. We present our participants' construal of team effectiveness, describing each theme and where possible, its apparent function, its development and how it relates with other group variables. The analysis resulted in six broad themes or components: culture and environment, values, communication, understanding, leadership, and unique individuals. The components appeared to be valued similarly across participants, although some gender and positional differences were apparent.

1. Culture and Environment

The majority of participants referred to the importance of creating an environment that would sustain effective teamwork, "The environment for me creates where the group is going, how you want them to behave, setting boundaries" (Female coach 6- females: this denotes a female coach working in women's cricket). Although predominantly discussed by coaches and psychologists, players also recognised the importance of having an environment in which a team could thrive, "It doesn't matter how many good players you have, if you haven't got the right team dynamic, if the environment's not right, then you're going to go astray pretty quickly" (Player 6- male). Participants saw the coach as primarily responsible for the creation of this environment ("My role as a leader is to trigger that environment and that culture and pave the way"; Male coach 5- females) whereas, the captain and senior players were tasked with policing the environment through the reinforcement of values,

You want experienced people to be able to run the team and actually enforce the culture and the values that you're trying to implement...but you need policemen,

effectively, in the team that can look after those values, and protect [them] (Male coach 2- males).

Coaches and psychologists considered an effective environment to be one in which there was a relative absence of fear of judgement from the group, and individuals felt able to “be themselves, on and off the pitch. ‘I’m the cricketer I want to be, and it’s OK to be me. And then off the field, I can be who I am within the context of the group’” (Male psych 1- males).

The term *safe environment* seemed to represent a concept based on trust, and a freedom to speak openly and honestly, “Having an environment where you can have that open, clean feedback is really, really key...knowing that you’re not going to be judged because of what you’re going to say” (Male psych 4- males). The narratives suggested that a safe environment allowed players to operate and play with freedom, and without fear of being judged or criticised, “It’s alright for me to come in and play my game” (Male psych 1- males).

Although minimal sex differences were apparent, management staff (e.g., coaches and psychologists) were more aware than players of both the need to create an appropriate environment and what such an environment might look like. This may be because staff considered the creation of an effective environment to be principally their responsibility.

2. Values

Values, as “a way of working, a way of behaving that enables us to go about our business on a daily basis consistently, to work towards our team vision” (Male coach 5- females), were seen as central to an effective team culture and environment by all participants.

[The coach] coming in and really making a big emphasis on our culture and how we can live and die by our values is something that I think has been instrumental in us being as successful as we have been in the last 18 months (Player 7- female).

The values held by teams included, “enjoyment is a value that we want to instil... honesty is another one. Trust is another one” (Male coach 2- males); “responsibility, excellence, commitment” (Player 3- female).

The adoption of a set of team values appeared to provide players (and coaches) with standards by which to hold themselves accountable. They defined what behaviours were (un)acceptable, and provided markers by which to evaluate whether team members were buying into the team vision, “Having the values as everyone agrees to them gives us something to measure ourselves against... They give you something to check yourself against and check other people against... they give the team a common focus” (Player 3- female). As alluded to earlier, coaches and psychologists generally believed the most effective way to ensure individuals were being accountable for their actions and behaviours was for players to take responsibility for policing the values. Overall, values seemed to create the most effective culture and environment; providing guidelines for the behaviours that would facilitate the development of a highly effective team. Interestingly, females spoke more of the importance of values; particularly trust and honesty.

Trust. Trust appeared to be an indispensable component of team effectiveness; referred to by all participants. Psychologists, in particular, spoke at length about the importance of trust, and this is reflected in the following quotations, “That trust aspect is crucial... you might not necessarily get on with people, but you trust they’re actually doing what’s best for the team” (Player 6- male). Trust between team members predominantly referred to the belief that individuals would commit to and work hard for the team, and that they had the ability to perform the role that was required of them by the team. Belief that a team mate was committed to the team was established through training and practice, by seeing what players were actually doing,

[Trust] comes from everything you do in practice to ensure players see what each other are doing, working incredibly hard... Rather than players questioning each other on whether they're doing their work smartly away from camps... it's trusting your teammates to be doing that work away from here (Male coach 5- females).

The second element of trust, belief in the ability of the team and others, seemed to be closely related to collective and other efficacy. In short, individuals needed to believe in team mates' ability to perform "in the middle" in order to trust them, "It's your trust in the guy to do his job...you're trusting yourself with your bowlers or batters to do their job" (Player 5- male).

As well as trust in team members, participants spoke also of the importance of players' trust in the leadership; coaches, management, and the captain. Male and female players emphasised the value of this trust, "In terms of building trust between the coaches and the players, that's really important and I think when you have that trust, you have players who really want to play for you, really want to fight for you" (Player 3- female). Ultimately, trust in the leadership resulted in individuals following the direction and example set by the leader, "[When] you know you trust the leader. I think you get followership. I think that's the bottom line" (Male psych 3- males). This led to team members accepting advice, and implementing the processes and procedures established by the leaders, "There's got to be a level of trust to say 'right OK, that's great. Those are the plans. I'm going to try and make sure we can execute that as a team'" (Male psych 4- males).

Participants also discussed their experiences of lack of trust; without trust between players, communication became more challenging, with feedback either not being given or interpreted in a manner that was not intended. Consequently, conflict was seen to become more likely, for instance, "you can't challenge without trust. Challenge without trust is like a war zone" (Male psych 3- males). A lack of trust in the leadership and management was also seen to have particularly deleterious effects on a team; ultimately, resulting in a lack of buy-

in, “The lack of trust ... between the head coach and some of the senior players resulted in them not buying into the strategy, and them not ultimately performing as well as they could” (Male psych 2- males).

Honesty. The importance of trust within the team environment was closely linked to another core value, honesty. Interestingly, although psychologists emphasised the importance of trust, honesty was referred to more frequently by coaches and players. The two values were often cited as fundamentally important however, and influenced one another, “I think the more honesty, and the trust you have within each other can only benefit that team in good ways” (Female coach 6- females). Many participants discussed the need to build trust in order to develop and encourage honesty, as one player observed in relation to trust between players and staff, “It’s important in building up a trust between people within the environment so if there is a problem... you already have that trust built up, you know you can go and speak to that person if there’s a problem” (Female player 3).

Not only was trust thought to encourage honesty, participants suggested that there might be greater acceptance of honest feedback if there was trust between individuals, “If you trust your teammate is doing it [giving honest feedback] for your good, then so be it. You might not like it, it might not be what you want to hear, but ultimately it’s a better environment” (Male coach 2- males).

All participants believed that the best teams consistently strived to create an environment where individuals could be honest with themselves and honest with one another. Across all narratives, participants reflected upon the importance of players giving one another honest feedback. This type of feedback enabled recognition and correction of mistakes, facilitating the adaptability needed for a team collectively moving towards its shared vision (e.g., “We’ve got to be honest and up front with each other. It’s not a personal attack, it’s those 1-2 percenters that we want to get better as a team and, until you can honestly review

your performance, you won't get there"; Player 7- female). Honesty was also considered necessary to challenge team members on their behaviours, "I don't think people should be too nicey nice in the dressing room. If someone isn't doing it right make sure they know it, and tell them. They can disagree ... but ultimately you can sort things out" (Male coach 2- males). This form of communication served to call people up on behaviours considered to be outside of the values ascribed to by the team, or the roles and responsibilities of the individual. By monitoring the agreed values, players took responsibility for upholding the team's culture and standards.

Many participants referred to these honest challenges as 'constructive conflict'; different to 'destructive conflict' in that it was "in the open...It's helped by guys having a better understanding of each other and having a mutual regard for wanting the individual to improve, the team to improve" (Player 2- male). Destructive conflict, on the other hand, tended to be more personal, and lacked positive intent,

... [it's] pointing fingers and it's blaming. So it's not about me telling you this so we can get better, it's about me telling you this so you can feel worse about yourself and I can feel better about myself. For me it's just taking the team bit out of it, and it's an exercise in blame (Male psych 2- males).

Through the generation of ideas and ways to improve, constructive conflict was thought to have a positive impact upon teams. More specifically,

It's important that players get opinions out there, and actually that conflict may be a turning point for a team that either isn't performing well or needs something to occur to create a spark in that group which either then galvanises a group, or gets them on the same page (Male psych 5- females).

Conversely, destructive conflict appeared to have a particularly negative effect, "...we had a lot of conflict in the dressing room... guys couldn't see past their own little feud... We got relegated that year and it was just nasty" (Player 2- male).

Without honesty, teams had the potential to breed mistrust, divisions, and conflict:

That honesty with yourself, honesty with your teammates, will make a good team. And if you don't have those features I think... it just creates obstacles. And suspicions, mistrust... [Without honesty] it becomes fragmented. People look after their own patch, and probably go for individual goals rather than team goals (Manager 1- male).

The main gender difference emerging from the narratives related to honest communication. Female Player 7 observed, "I think women are generally...not great at taking on criticism because they take it quite personally". Equally, female Coach 6 stated that "as soon as you say 'honest', or 'I'm going to give feedback', the girls cringe because it's going to be something that they're not comfortable with and they don't want to hear". Males however, were thought to be more open to challenge and criticism than females, and able to separate cricket-related feedback from something more personal (e.g., "there's a greater openness to conflict and challenge in a male population... The ability to separate it from individual or task is potentially easier, and it comes back to 'it's cricket', and what's said is said and it's done, dealt with"; Male psych 5- females). Consistent with this distinction, all participants involved in women's cricket reinforced the importance of values for creating the most effective environment. Honesty, in particular, provided players with accountability through which they were impelled to be honest for the greater good of the team. With honesty as a core value it appeared more likely that confrontations would be interpreted less as a personal attack (e.g., "Now [the players] don't see [honesty] as a personal attack. Everyone is just trying to make the team better"; Player 7- female).

Responsibility. Having a sense of personal responsibility was also frequently cited as a core value. The creation of a responsible environment was seen to develop through individuals being honest with themselves. This required team members to have a good level of self-awareness, and the ability to reflect honestly on their own performances,

[Honesty] has helped with people really trying to take accountability for their performance...and as well as being honest with other people, be honest with themselves and really reflect on the game and think about how they've performed...do they need to improve, did they fall short? (Player 3- female).

Personal responsibility was thought to be of greatest value to a team when players openly admitted mistakes and shortcomings to the team as a whole (e.g., "It's about being honest with yourself... the team environment that produces an atmosphere that somebody can stand up and say 'I was wrong, I'm sorry', not 'it happened for this, it's your fault'... That is the culture you want"; Manager 1- male). Moreover, in order to create an environment that encouraged honest communication and personal responsibility, many of the participants spoke of the need for senior players and leaders to role model these behaviours and set a precedent for players to follow, "I put my hand up and exposed myself on something I'd f*^ked up on previously... I'm going to try and role model that behaviour of exposing myself..., with the hope and expectation that then other people would follow" (Male coach 4- females).

3. Communication

Communication permeated many of the factors discussed in the narratives. In line with the value of honesty, open and honest communication, discussed at length by all participants, appeared to be a highly valued form of communication. However female coach 7 countered this, suggesting that the use of honest communication in teams is more complex than merely being honest all of time,

I think there's got to be some constructive feedback communication in there, there's got to be communication in and around what you're feeling and what's going on, communication in regard to what are our team goals and objectives, 'what do we want to get out of this?' But I just don't feel that it has to be honest all the time.

Rather than always being honest, the function of any communication was to provide clarity around team relevant information in order to enable a shared understanding to develop as illustrated by Male psychologist 2's sentiment,

In my mind, there's a clear strategy, and a clear goal that you're trying to achieve, or a clear way that you're trying to play, and people...know how they fit into that... when it's done well they are communicated up front, and expectations are communicated around those behaviours they're going to exhibit in those roles.

Male coach 3 stressed the importance of communication by saying that, "You can have the best framework you like, but unless [every]one knows, and it's effectively communicated and effectively reviewed regularly, then it's worthless".

Ineffective communication. Conversely, ineffective communication failed to provide clarity, and resulted in a lack of understanding of important issues,

Ineffective communication would be where the players... don't know the principles of the environment, they don't know what's expected of them, they don't know what they're accountable for, they don't know what their role is. Anything which leaves them in a confused place like that I think is poor communication (Male coach 3-males).

Any ambiguity resulting from a lack of information made it less likely that individuals would follow the same (bowling) plans, resulting in inconsistent, or uncoordinated performances.

Destructive communication. Whereas ineffective communication failed to provide necessary information and interfered with team understanding, destructive communication

seemed to conflict with team values, was associated with a lack of trust, and resulted in greater potential for conflict. This included communication that was not open, but took place behind peoples' backs, or manifested as rumours, "As soon as you start hearing rumours of signings, or underlying currents of certain people are bringing in ... conflict without realising, you start to undermine the team dynamic" (Player 1- male). Moaning and complaining was another form of destructive communication that had the potential to disrupt the team, and reflected a level of discontent and lack of trust, "My only experience of it [a team about to fail] was senior players sniping 'he's sh*t, he doesn't do this, he doesn't work hard enough, he hasn't got a clue what he's doing'. That's the sign the wheels are about to fall off" (Male coach 3- males).

4. Understanding

Shared understanding across a team, established through open communication, was discussed by all participants as being particularly influential. Indeed, female player 4 thought the single most positive influence on a team was,

...learning how each other works, and learning what makes each other tick, so that when you go out there you know exactly how the girls want to play- like their strengths, and you understand that, and then you can take that together as a team and go forward with that knowledge of each other.

This theme comprised of an understanding by players of their team members' personalities, leader understanding of individuals' personalities, an understanding of players' games, and a shared understanding of task-related issues or TMMs.

An understanding of individuals' personalities. An understanding of individuals' personalities was discussed at length, and highlighted (particularly by players) as important for knowing when and how to best support team members,

When you've learnt those different traits about each individual it helps the team... maybe someone who is going through a tough spot on the field, you can understand how to help them react and go through that, and what support is needed... So I think that's where it's very important (Player 1- male).

Understanding enabled players to approach and communicate with team members in the most effective way, where failure to do so could result in irritation or frustration,

Knowing how someone ticks off the pitch is just as important as on the pitch because if you don't understand how they like to be spoken to, you can snap at someone on the pitch. There are certain people who like direct feedback, there are some people who like to reflect a little bit more (Player 7- female).

Although most participants stated that not all team members would necessarily get along, they acknowledged that if individuals could appreciate and understand differences, then frustration would reduce. Furthermore, many of the participants discussed the use of personality profiling as a means by which to better understand team members and using that knowledge to appreciate individual differences. Coaches, players, and psychologists all reflected on the value of such processes, "Doing personality preferences is a big insight...it has a huge slant in terms of helping them to develop and understand and improve their appreciation of others" (Male psych 5- females). Nevertheless, this theme may have been particularly discussed by players because they have greater first-hand experience of knowing how understanding fellow teammates can influence team effectiveness in the field. An understanding of others' personalities enabled teammates to recognise when individuals might need support and appreciate how best to provide that.

Leaders' understanding of individuals' personalities. It was considered to be particularly important that both coaches and captains, as leaders of the team, developed an understanding of individual personalities. Many participants felt that this knowledge

contributed to leaders being able to get the best out of individuals, and ultimately the team.

This was a view shared by coaches, players, and psychologists across male and female teams.

Male player 1 suggested,

[The coach] understands the individual dynamic in the changing room, what works for individuals. And the quicker he picks that up when he comes in, the better that team is going to function...There's so many individuals that make up a team. Different kind of individuals, and if the coach realises that quickly he'll get a good team out of it.

Understanding individual capabilities. Beyond the understanding of personalities, participants also spoke about understanding the way in which team members played. Time spent training together gaining this knowledge improved coordination (e.g., "Understanding other people's games is quite important. So the more teams spend time together, the more they can second guess what somebody is going to do, which helps"; Male coach 1- males). Furthermore, female player 4 felt this could make the difference between winning and losing,

Having trained with all of the girls over the summer I've got a massive increased awareness of what people can do... the girl that I bat with at [county], I know that if a ball is bowled in a certain area, she's going to hit it in that area, and I've already started running. Little things like that might only make 0.5% of differences, but you add them all up and actually it can be the difference between winning and losing.

Team mental models. The understanding of elements pertaining to the team's task that was discussed by participants relates to the concept of TMMs (Klimoski & Mohammed, 1994) representing shared knowledge about key features of the team's environment. Across the participants (particularly the psychologists) this knowledge was seen to develop from clarity around a team's vision, goal, plans and individual roles,

If you're chasing 300, 'how are we going to go about it? Does everyone understand it? Does everyone see why that's the route we're going to take? ... I'd say possibly more

than any other sport I can think of, [cricket] is about that tactical collective mindset
(Female manager 2- females).

Male psychologist 5 reflected on his experience working with a female team, “[TMMs have] been really influential in the players in the team having consistent success... I think by having a framework in which the players went out to play a brand of cricket it gave clear direction to how the players were going to do it.”

Clarity of individual roles, in particular, was considered to contribute to effectiveness when shared across the team; communicated clearly to the individual who occupied the role and to the team as a whole. This enabled a shared understanding which resulted in less blame and more acceptance if things went wrong, and was spoken about extensively by all participants,

It’s really important to the group that they know what each individual is trying to do.

So if this guy is a wicket taker and he might go for a few runs, if the rest of the team are going ‘oh f*^king hell, why’s he trying that?’, whereas if they know, they’re likely to go ‘yeah come on, keep going, you’re going to get a wicket’ (Male coach 3- males).

Understanding one another’s roles ensured that players were less likely to place blame on other team members. This increased the acceptance of errors/mistakes, and so reduced the likelihood of conflict. Thus, it appeared to be a highly-valued quality within all narratives. In addition, understanding task-related elements enabled the team to work together and coordinate effectively.

If we know we’re trying to bowl leg-stump Yorkers then if you’re fielding at square leg you know where the ball is likely to be going... there’s definitely a shared understanding of that. Same with batters that you clearly understand this is this guy’s strengths, and this is his go to shot to get off strike, and if he hits it there... I’ve got to run my first 2 as hard as I can (Male psych 2- males).

As female coach 6 explained, the understanding required for coordinated action came down to the team's preparation, and communicating the necessary information to the team,

It's important for the bowler to understand where they want to bowl, and then it's important for the fielders to understand where they're trying to bowl to where they stand... it comes back to the role and the clarity in your game plan and everyone's clear on what you want to execute.

In contrast if a team's game plans and roles were not clearly understood by team members, then participants discussed the potential for this to interfere with coordinated performance. Ultimately this was perceived to result in individuals striving towards individual rather than team goals (e.g., "If you don't have it [understanding] then you get some cracks appearing because people start questioning things, and if you don't have a coherent unit, you've got that individual element"; Player 2- male).

5. Leadership

Leadership appeared to play an important role in many of the teamwork variables discussed, "My experience would be the leadership... when that was done best, that was best team functioning, or team environment that was created" (Male psych 2- males). Moreover, effective leadership was considered to be critical for a team to enjoy long term success,

You can have a group of players who are outstanding players, they're able to go out there and perform despite a certain environment and certain individuals. But to be successful for a long period of time, I think you need good leadership (Male coach 5- females).

The importance of leadership to many participants was in the creation and reinforcement of the aforementioned environment. The coach was considered responsible for creating the most appropriate environment, with the captain responsible for role modelling desired behaviours, "My role as a leader is to trigger that environment and that culture and

pave the way” (Male coach 5- males). Through the creation of an environment and culture with clear vision and values, leadership appeared to provide the team with direction (e.g., “I think you get good leadership, I think you get direction”; Male psych 3- males). This direction came from leaders providing a clear inspirational vision and leading by example.

Inspirational vision. Many of the participants referred to effective leaders as being inspirational and passionate (e.g., “He [the captain] was ridiculously inspirational... he was very good as a leader”; Player 1- male) and this, in turn, transferred on to others,

You can see that [the captain] just absolutely loves the game, and wants everybody to be better, and just wants to win. There’s that desire for success, and then obviously because she is so determined and focused, you want to play for her, you want to do well because she’s your captain (Player 4- female).

Lead by example. Another characteristic of effective leaders evident in the narratives was that they led by example. This was considered to be particularly important for role modelling the behaviours required by the team’s culture and values. In this respect, the leader was responsible for setting a precedent for others to follow,

If you’re leading as a captain, you have to set by example... You do have to be the one that this is an example of the team that we’re going to be. These are the characteristics that we’re going to portray, and this is how we’re going to be as a group of individuals (Male psych 4- males).

Role of the coach vs captain. Many participants believed the coach and captain occupied different, but complementary, leadership roles. As alluded to above, effective coach leadership involved the implementation of values, roles, and games plans, whereas captains inspired their teams to move in a single direction, setting an example for others to follow. This complementarity was also discussed across team settings with the coach responsible for

the environment, training and practices, and the captain predominantly responsible for leadership on match days,

The coach - very much in charge of the overall set-up... But there was a kind of ceremonial hand-over from the coach to the captain prior to the game starting and then, while the game was on, anything that goes on on the field is the captain's stuff... I suppose in that respect, each of the leaders appreciating each other's role and when whose time it was to do what (Player 6- male).

Leadership seemed to be most effective when both parties understood and accepted their respective roles and responsibilities, as female coach 6 suggested, "The best working relationships I've had have been the coach and the captain are really clear on which bit is theirs and which bit is the captain's".

Coach-captain relationship. Despite differing leadership responsibilities, all participants emphasised the importance of the coach and captain having a good relationship, and being able to present a united, cohesive leadership approach to the team,

The captain/coach relationship is so, so, important. Having similar philosophies on the type of cricket you want to play, on the game generally, on the type of people you want...if you start getting conflicts there, then it becomes really difficult very quickly.

Conversely, any divisions between the coach and captain had a negative influence on the team, as male psychologist 5 reflected of his experience with a female team,

Initially [coach] and [captain] didn't have a very strong relationship, and they had very different opinions on where the team was going and what was success. And they had very different opinions on how to go about those plans, which in the short term created some tension and that had a big impact on the culture, the confidence, communication and performance. When those two became more aligned... got some clarity on where they, as a unit, wanted to go, and what they wanted to achieve and how they were

going to achieve that... I think that created the environment which enabled the processes that needed to be in place... which then had a knock-on effect because there was consistency, and everything aligned towards one goal.

The benefit of a strong coach-captain relationship appeared to be a consistent and unified approach to leadership; one which gave players a clear direction whereas, a lack of unity between the coach and captain could create ambiguity and confusion.

Ineffective leadership. Given the central nature of leadership for teams it should come as little surprise that several participants referred to a lack of leadership, or ineffective leadership as being one of the most detrimental influences on a team. Essentially, a lack of leadership failed to provide a team with any direction (“We were lacking any kind of direction, any real enthusiasm from [the coach], and we had a fairly poor captain who disappeared off the face of the earth halfway through the season. So I think however strong a team is, you’ll struggle”; Female player 3).

6. Unique individuals

A large proportion of participant narratives referred to the components that contributed to team effectiveness. However, the influence of selfish or individually-oriented players on a team was also discussed by all participants as having the greatest potential to disrupt a team. Despite the fact that all participants considered an individual becoming more important than the team as having the single most negative effect upon a team, selfishness represented an interesting paradox, given that “the nature of cricket is that it’s an individual sport played by a team” (Male coach 3- males), and that when batting or bowling players have primarily individual roles to fulfil. Male manager 1 commented that, “You could say to a batsman that ‘I want you to be really selfish and don’t give your wicket away?’ And then ‘I want you to play for the team’. Those are complete opposite statements”. Unique individuals were such because of their unique but contrasting contributions through skillful performances

whilst also being capable of disrupting the team. For instance, in certain contexts unique individuals contributed positively to a team, as they were particularly talented,

... you've got some very good players, some individuals that may well be selfish inside, but actually the selfishness makes them better players... someone can just love batting all day and actually batting all day wins us the game because they get lots of runs, but I think when it comes [at a] detriment [to] your teammate, that becomes an issue (Male coach 4- females).

Nonetheless, there appeared to be a point at which unique individuals became too destructive, as a team was considered to be at its best when all members bought in to the collective goals and ambitions. Participants explained that unique individuals can disrupt team functioning when the individual becomes more driven by their own agenda than that of the team (e.g., "When people have their own agendas it makes it quite tough... if their agenda is to do stuff that is against what the team is trying to do, then that obviously then has a detrimental effect on team performance"; Male coach 2- males). Moreover, most participants shared the view that once an individual's agenda started to interfere with what the team was trying to achieve, then that individual should be omitted from the team. There was seemingly a tipping point, beyond which the positive influence of the individual's performances was outweighed by their negative influence on the team,

It doesn't really matter if you're a fantastically talented individual, and you score 100s of runs, but you are detrimental to the rest of the team, and you bring a lot of the team down with you... you're not worth having around... There's a bit of a cost-benefit analysis there (Male psych 4- males).

Coaches, psychologists, and players all discussed the paradox of unique individuals, with consensus that there comes a time when they become too disruptive. However, a gender

difference was evident concerning unique individuals, as there seemed to be limited experience of these individuals within female cricket teams.

7. Other indicators of team effectiveness

Finally, there were a number of factors that appeared to represent visible indicators of an effective team. One of these was the extent to which the team remained physically united both on and off the field, evident in one coach's reflection of an ineffective team, "There was never any teamwork. They batted and disappeared. There was no sitting round together" (Female coach 9- females). This physical togetherness was also often evident in a team's celebration of one another's successes; frequently referred to as a marker of an effective team, "You can tell how much a team are a team in the way they celebrate a wicket. They're genuinely pleased for their teammates" (Manager 1- males). Another indication of effective team functioning was apparent from a team's behaviour in the field, "The moment you watch a team fielding... you'll tell a lot where they are as a team. If they're all together... and [all] helping each other out you'd probably say the team is in a decent place" (Male coach 2- males). A final marker of effectiveness referred to was a lack of scepticism within a team, "Scepticism not being around, and having collectively open minds. That was probably more powerful for the improvement of the team and its winning" (Male psych 1- males).

Discussion

The present research sought to gain a greater understanding of the multidimensional nature of team functioning and provide a novel conceptualisation of the most important factors for team effectiveness in professional cricket. Our method of enquiry enabled us to verify the relevance of a range of group factors with strong empirical and theoretical ties to team effectiveness, whilst also allowing participants to raise previously unrecognised constructs pertinent to their own experiences (e.g., trust and intra-group conflict). Many of the factors commonly viewed as being salient to team effectiveness (e.g., cohesion and collective

efficacy) did not appear in our analysis. This is likely a result of the parallel method of enquiry used, our emphasis on participants' views concerning the most important constructs for team functioning, and sampling from professional and international sport.

Timmermans and Tavory (2012) suggest that the aim of an abductive approach is theory construction where the researcher is led away from old to new theoretical insights. Therefore, Figure 2.1 depicts a novel conceptualisation of team effectiveness in cricket, derived from participant narratives, that differs from existing frameworks and the models discussed in our introduction. This is perhaps to be expected given that this study is the first to use a 'bottom-up' approach to develop an evidence-based framework of team functioning in sport. Our model is also representative of the language of coaches, players, and practitioners involved in elite cricket. It has a greater emphasis on broader components as compared to the more specific mediators that have been the dominant focus of previous research (cf. McEwan & Beauchamp, 2014). In fact, the discourse captured concerning the most important aspects of team effectiveness points to a number of original components that reflect more fundamental aspects underpinning the conventional group constructs reported in the literature to date; for example, culture/environment and trust.

The framework in Figure 2.1 is a heuristic model consolidating our participants' expert views regarding the essential ingredients for team effectiveness in professional cricket.

Summary of Essential Team Ingredients in professional cricket model

Within sport, leadership is one of the most heavily researched constructs in group dynamics (Kleinert et al., 2012), and meta-analytic organisational evidence is supportive of a positive relationship between leadership and team performance outcomes (Burke et al., 2006). Morgan et al. (2013) contend that leadership processes enable teams to survive and thrive over time. It is unsurprising therefore, that the importance of leadership was reflected in participants' narratives and is represented by its centrality in Figure 2.1. Leadership

permeated all aspects included in the model. Consistent with current understanding of transformational leadership (e.g., Callow et al., 2009), and more recent research on inspiration (e.g. Figgins, Smith, Sellars, Greenlees, & Knight, 2016), the best leaders were seen to display appropriate role modelling by setting a positive example and as well as providing a clear inspirational vision and direction for the team through a united coach-captain relationship.

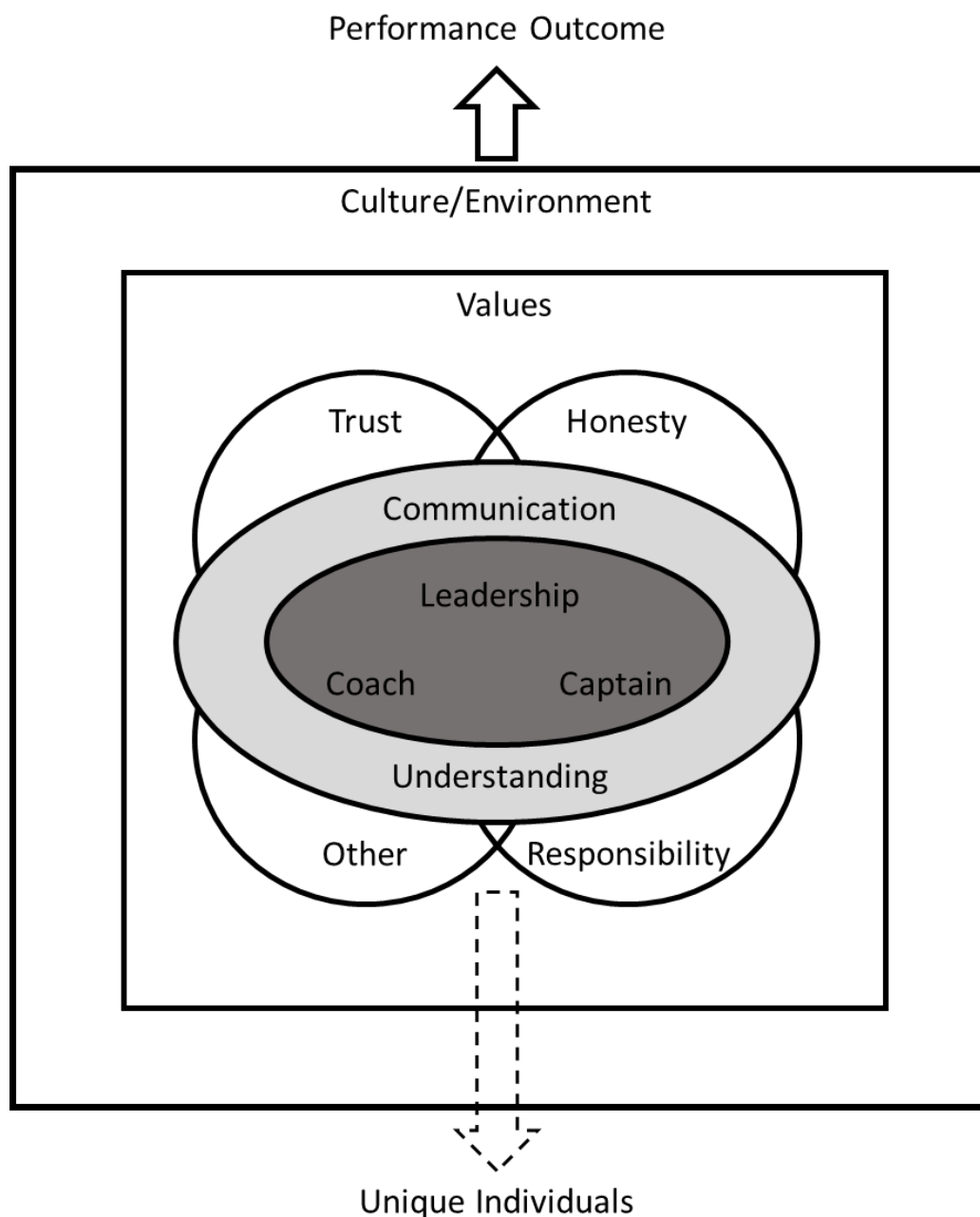


Figure 2.1. Applied heuristic of the model of Essential Ingredients in Team Effectiveness

Indeed, Figgins et al., (2016) suggested that inspiration from leaders may enhance group functioning through increased team-bonds and identification. Although the coach and captain occupied divergent leadership roles, presenting a united leadership approach enabled consistency and clarity of messages, and promoted trust. These findings are concordant with recent research that has explored the role of a sports captain in more detail (Cotterill & Cheetham, 2017). Notably, the captain's role was seen to include motivation (i.e., inspirational), embodiment of the culture (i.e., lead by example), and communications with coach (i.e., coach-captain relationship).

Working outwards, the model reflects the reported influence of leadership on the communication and subsequent level of understanding within a team (i.e., through inspirational vision, and an understanding of team members). Through open communication of team goals, game plans, and roles, a shared understanding developed. This finding is in line with the concept of TMMs as shared knowledge of key features of a teams' environment (Klimoski & Mohammed, 1994). This understanding allowed individuals to better coordinate with one another, and where there was shared understanding of individual roles, it circumvented potential conflict and frustration. Meta-analytic findings also support such a cognitive foundation to teamwork, revealing positive relationships between TMMs and group behavioural processes, team motivational states, and work related performance (DeChurch & Mesmer-Magnus, 2010). Moreover, Morgan and colleagues argue that resilient teams are able to draw on role systems and TMMs to enable a team to organise and adapt in adverse situations (Morgan et al., 2013; Morgan, Fletcher, & Sarkar, 2015). The relevance of team cognition has not been overlooked by sport researchers, as there is evidence of the presence of TMMs in sport (e.g., Filho et al. 2015).

Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) delineated two types of mental models: task-related models as discussed above, pertaining to materials needed for

the task (e.g., games plans, roles, etc.), and team-related models which contain expected behaviours of team members. Indeed, what appeared to be of greater value than task-related elements within the present research was an understanding of team members. Understanding others led to the provision of support to team members when required, and assuaged frustration that might develop from personality differences. Beauchamp, Lothian, and Timson (2008) provide evidence for the importance of understanding team members in sport, utilising a personality-preference based intervention to improve team trust and cohesion. Furthermore, this finding has certain similarities with the concept of emotional intelligence (Meyer & Fletcher, 2007). Indeed, the emotional awareness of individuals within a high-performance sports organisation influenced their ability to develop and maintain high-functioning relationships (Wagstaff, Fletcher & Hanton, 2012). Unsurprisingly, a greater understanding of the emotions, personalities and behaviours of oneself and others appears to be beneficial to social relations and interactions within the context of a team. This 'social capital' has been found to be a critical characteristic of teams able to withstand a range of collective stressors (Morgan et al., 2013).

The development and maintenance of a set of values; principles that drove the behaviours required to achieve the team vision, were seen as central to enabling efficient communication, developing shared understanding, and creating an effective team culture. There are a multitude of values that teams might ascribe to, but the relative importance of any value is specific to a given team and determined by the culture and vision of that team (Shoenfelt, 2011). The most commonly cited values of trust, honesty, and responsibility ensured effective interpersonal exchanges between team members, open and challenging communication, and an acceptance of mistakes. In related research with resilient sports teams, Morgan et al. (2013) found the development of a shared vision led to the ability to challenge one another against agreed standards.

Trust, in particular, was a value that participants viewed as fundamental to long-term success; referring to both a belief in team mates' abilities and trust in their intention to act in the best interests of the team. The importance of trust in establishing a high-performance culture was also apparent in a recent case study of mental toughness in an Australian Football League team. Coulter, Mallet, and Singer (2016) found that being trusted held cultural significance in the club and was the basis from which other values (e.g., *team first*) were developed. A recent meta-analysis in organisational psychology revealed a strong, positive relationship between both intra-team trust and team trust in the leader, and team performance (De Jong, Dirks, & Gillespie, 2016). However, despite being one of the most frequently studied constructs in organisational research (De Jong, Kroon, & Schilke, 2017), trust has received little research attention in sport. The present findings, aligned with a wealth of literature in organisational psychology, suggest that future research in this area is warranted.

Constructive feedback, discussed as part of team honesty, is an important adjustment behaviour that enables teams to make changes to improve performances and ensure goal attainment (Rousseau et al., 2006). It has been suggested that resilient teams gain strength through others' feedback following disappointments (Morgan et al., 2013; 2015). However, gender differences evident in the present research suggest that male teams may be more open to this challenge and criticism. Interestingly, a recent review of conflict in sport found that male athletes appeared to engage in more conflict behaviours and communication than female athletes (Wachsmuth, Jowett, & Harwood, 2016). Although there is scant research regarding psychological differences between male and female sports teams (Cronin, Arthur, Hardy, & Callow, 2015), Eys et al. (2015) found males to be more open with one another than females, particularly in relation to expressing and resolving conflicts. Taken together, these results point towards an underlying difference in the interdependence of males and females that requires further research.

Culture has previously been defined as a collection of shared values, beliefs, expectations and practices across members of a defined group (Cruickshank & Collins, 2012). Within the present research an effective team appeared to develop from the culture and environment within which it was situated. Principally established by the coach, and role modelled and reinforced by the captain, high performance environments contain a clear vision of success, and a set of values. This is in line with a growing body of research which recognises the critical influence of organisational culture and high-performance environment in professional sport (e.g., Fletcher & Wagstaff, 2009), highlighting in particular the importance of leadership in the creation and regulation of such high-performance cultures (Cruickshank, Collins, & Minten, 2015). From the perspective of coaches and practitioners, the most effective environment was a 'safe environment' where individuals felt able to "be themselves, on and off the pitch". Although the term 'safe' represents a slightly clichéd perspective of an environment that is inherently pressurised and challenging (e.g., Mellalieu, Hanton, & Fletcher, 2009), this term most accurately reflected participants' narratives. The construct bears semblance to the concept of team psychological safety; trust that the team will not embarrass, reject, or punish someone for speaking up (Edmondson & Lei, 2014), where the absence of threat from inside the group enables a climate in which members are comfortable being themselves. This facilitates team learning, and in turn effectiveness (see Edmondson & Lei for a review).

Overall, team effectiveness appeared to be the result of a group of individuals striving in the same direction towards a shared vision and performance outcome. This was made possible by leaders affording clarity of vision, values, and roles through open communication, and the provision of an inspirational role model for the team to follow. The influence of unique individuals within a team, at times, facilitated this endeavour through strong individual performances. However, when the individual's agenda conflicted with the team's direction,

then his/her influence was considered too detrimental to the team environment. Indeed, sometimes “a single, toxic team member may be the catalyst for group-level dysfunction” (Felps, Mitchell, & Buyington, 2006, p. 176). Cope, Eys, Schinke, and Bosselut (2010) found the informal ‘cancer role’—individuals who display negative interpersonal behaviours despite often being highly talented—to have a particularly deleterious effect on group functioning. Such players can create a dilemma whereby coaches have to decide whether the talent of the individual outweighs their potential to disrupt the team. However, it could be argued that a greater understanding of individual personalities (as discussed above) may assuage potential frustrations and provide leaders with more detailed information to utilise in the effective management of such individuals.

Limitations and considerations for future research

The present findings ought to be interpreted in the context of certain boundaries. Although the number and variety of participants interviewed is a strength, facilitating an in-depth examination of team functioning within elite sport, the exclusive focus of the study on cricket potentially limits the transferability of the findings. Thus, a worthwhile extension of the research would be to assess whether the importance of these attributes holds true across a variety of team sports. In addition, investigating a complex social phenomenon such as teamwork through interviews alone is arguably reductionist; failing to offer a complete account of the lived experience of team effectiveness (Smith & Sparkes, 2008). Capturing in situ observations of critical incidents of teamwork would have minimised the constraint of relying on participant recall alone and might have resulted in an even more comprehensive conceptualisation of the phenomena. At the very least it could present an important complementary view of effective teamwork. Nevertheless, the present study clearly highlights the need for researchers to consider constructs outside of the traditional sports team literature if they are to better understand team functioning.

A logical extension to the present research would be to test whether the components included in the model can successfully discriminate between effective and ineffective teams. Such knowledge would not only attest to the import of certain attributes over others, it would also highlight areas for further investigation. Moreover, such quantitative data could enable the development of a diagnostic tool to assess whether teams are showing signs of sub-optimal functioning (cf. McEwan & Beauchamp, 2014).

Within the presented model, the importance of culture serves as a reminder that teams do not exist within a vacuum, and that there are numerous climatic and cultural factors associated with the optimal development of high performance teams (Fletcher & Wagstaff, 2009). A potential shortcoming of the present research is that it failed to explore the impact of wider support teams on effective team functioning (e.g., Collins, Moore, Mitchell, & Alpress, 1999), or the ways in which the constructs raised in the narratives related to the wider support team (i.e., trust). Drawing on a growing body of literature in organisational psychology in sport, this would be a note-worthy extension to the present research.

Applied implications

The proposed model, formulated from the accounts of players, coaches, and practitioners involved in professional cricket provides a unique conceptualisation of team effectiveness that is parsimonious, sport specific, and practical. Additionally, the presence of some sex differences flag more nuanced aspects of team functioning which might more effectively shape the style of communication fostered in male and female teams. It may be advisable for those involved in female team sports to be mindful of the potential impact of conflict on relationships and ensure that such exchanges are managed in a timely manner. By retaining the terminology utilised by participants, individuals working with sports teams can draw upon this model as a guide by which to prioritise their long-term team building efforts and share ideas with coaches and players unambiguously (cf. Paradis & Martin, 2012). Recent

meta-analytic evidence provides support for the efficacy of team training interventions, particularly workshops, simulation training, and review-type activities (McEwan, Ruissen, Eys, Zumbo, and Beauchamp, 2017). It would be reasonable to believe, therefore, that a team training intervention targeting elements of the model would be particularly efficacious. A specific example of this might involve the structuring of debriefs (cf. Tannenbaum & Cerasoli, 2013) around the components of the model to provide teams with a clearer indication of areas for improvement, and present potential warning signs that might flag latent problems in team functioning that are about to surface.

Furthermore, it is possible that the model will provide direction for coaches tasked with bringing together collections of individuals into scratch teams (e.g., for international competitions) who are expected to bond and produce results quickly. Practitioners utilising the model must, however, be mindful of its specificity to cricket, and consider the relevance and applicability to their own team sport.

Conclusion

There are a multitude of concepts that have been associated with group-level outcomes in both sport and organisations. Consequently, it is doubtful that a single model of team effectiveness can accurately capture all these features in detail. Furthermore, those factors of greatest importance may differ across sports, genders, competitive levels, and stages of development. Nonetheless, as a result of our thorough analytic approach (e.g., supplementary analyses concerning sex differences), the subsequent and new conceptualisation offers a practical and relatively parsimonious model of team effectiveness, representative of experiences in elite cricket, which can be applied and/or adapted by those responsible for the creation of high performing sports teams.

Chapter 3

**Biggest hitters: A pattern recognition approach
to understanding team effectiveness**

Abstract

Although there are numerous instances when (sports) teams' performances exceed the sum of their parts (e.g., Leicester City FC winning the 2015-16 English Premier League title), there remains very limited understanding as to what contributes to team effectiveness. An assumed antecedent of team effectiveness is how a team functions or its teamwork, the collection of behavioural processes and emergent states that enable a team to complete interdependent tasks (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). However, understanding the complex relationship between teamwork and team effectiveness is hampered by a lack of an appropriate measure of teamwork or team effectiveness in sport. Therefore, in this investigation we utilise the model of Essential Team Ingredients (ETI; Chapter 2) to develop and validate a measure of teamwork and team effectiveness contextualised to cricket teams. Study 1 adopted a new paradigm of measurement design to validate a multi-construct, single-item based inventory. Eighteen cricket experts rated the clarity and match of items within the Inventory of Essential Team Ingredients (IETI), revealing noteworthy validity. Subsequently, study 2 employed pattern recognition analyses to examine the extent to which factors within the ETI could accurately predict effective teams using a sample of 32 high performing male and female cricket teams. Results revealed that certain features could accurately predict an effective team in nearly 90% of instances. Notably, elements of trust, leadership, and understanding consistently contributed to the accurate prediction of effective teams.

Although there are numerous instances when (sports) teams' performances exceed the sum of their parts (e.g., Leicester City FC winning the 2015-16 English Premier League title), there remains very limited understanding as to what contributes to team effectiveness. An assumed antecedent of team effectiveness is how a team functions or its teamwork, the collection of behavioural processes and emergent states that enable a team to complete interdependent tasks (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). An additional consideration is the need for context specific conceptualisations and measures of teamwork and team effectiveness in order to best characterise this complex relationship. Moreover, because there are so many facets to teamwork and team effectiveness, understanding of the most important aspects for optimal intervention work is almost none existent. Given the absence of appropriate measures, compounding the limited empirical knowledge base, in the current investigation we develop and validate measures of teamwork and team effectiveness contextualised to sports teams, enabling us to provide insight into these important group dynamic research questions. The research was commissioned by the England and Wales Cricket Board (ECB) and so focuses on the effectiveness of professional cricket teams. While the sport of cricket could be considered rather niche (although there is clear overlap to baseball and it is a global multimillion dollar industry), of note for the write up of this project is the two pronged subtext of relevance for the wider field of psychology regarding; (a) the development of measures of highly multidimensional constructs that need to be administered in applied settings where time is limited, and (b) the development of a procedure enabling the use of informant ratings from non-reciprocal pairings (i.e., where all raters do not rate all observations). We pick up on both these broader issues when appropriate.

Theoretical backdrop

Researchers' interest in teamwork and team effectiveness has led to the development of a great many frameworks espousing to conceptualise the constructs (e.g., 138; Salas, Sims,

& Burke, 2005). These have been largely developed for organisational (e.g., Marks, Mathieu, & Zaccaro, 2001; Ilgen et al., 2005) and to a lesser extent, healthcare (e.g., Manser, 2009) settings, and as a result, have questionable relevance when examining sports teams. Within the sport psychology literature teamwork has traditionally been operationalised as cohesion (Barker, 2007; Collins and Durand-Bush, 2015). More recently, McEwan and Beauchamp (2014) proposed a model of teamwork and team effectiveness that combined two prominent frameworks from organisational psychology; Mathieu, Maynard, Rapp, and Gilson's (2008) Input-Mediator-Output framework, and Rousseau, Aubé, and Savoie's (2006) teamwork behaviours framework. The resulting model emphasised mediating factors divided into three classes which contribute to the management of team maintenance (i.e., psychological support and conflict management), the regulation of team performance (i.e., preparation, execution, evaluation, and adjustment processes), and emergent states (i.e., cohesion and collective efficacy). The range of included mediators recognised the importance of cognitive, attitudinal, motivational, and affective states for team effectiveness, as well as the more traditionally accepted teamwork processes or behaviours. However, many of the teamwork variables contained within this framework have received scant research attention in the context of sport, and appear for the time being at least, only anecdotally related to team effectiveness in sport. Consequently, sports researchers remain in need of an appropriate conceptual framework to ground their investigations including their attempts to develop robust measures.

The present investigation is couched within the model of essential team ingredients (ETI; see Figure 3.1¹) from Chapter 2. This framework is the upshot of an abductive qualitative investigation involving 21 cricket experts representing professional players, coaches, and psychologists competing professionally and/or on the international stage.

¹ This is a published article: Webster, L. V., Hardy, J., & Hardy, L. (2017). Big Hitters: Important Factors Characterizing Team Effectiveness in Professional Cricket. *Frontiers in Psychology*, 8, 1140. DOI: <https://doi.org/10.3389/fpsyg.2017.01140>

Consistent with the vast majority of previous theorising, participants' construal of team effectiveness was complex; in all, 27 features were identified. The cricket experts believed team effectiveness was underpinned by an environment providing a *vision* or shared motivating long-term team goal and built around a set of agreed *values* guiding the daily behaviours necessary to achieve the team vision. Participants described the optimal team culture as reflecting a safe environment whereby cricketers were free to play without fear of being unjustly criticised (*safe to play*) and were encouraged to speak openly (*safe to speak*).

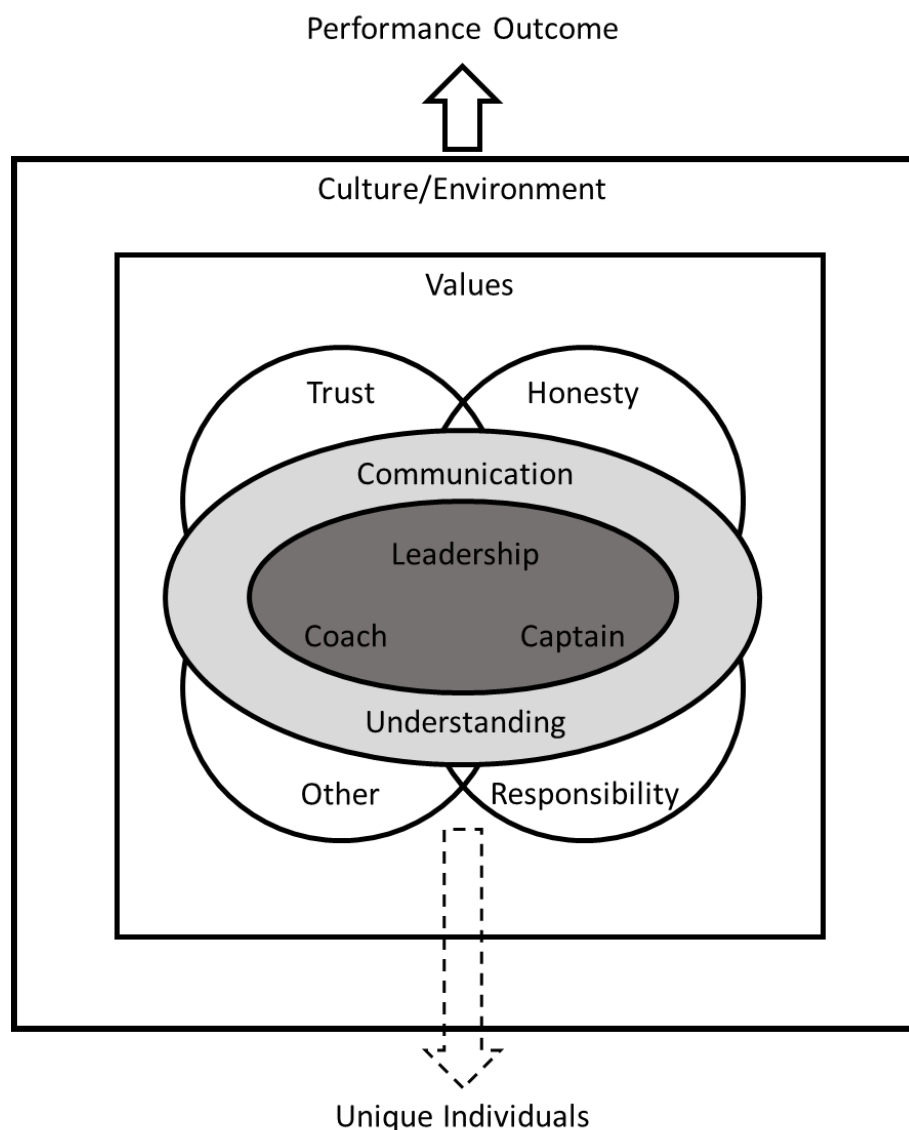


Figure 3.1. Applied heuristic of the Essential Ingredients of Team Effectiveness.

Trust also formed a central pillar of effective team environments; this involved trust in individuals' *competence* and belief that their *intentions* were for the benefit of the team. Players' *trust in the leaders* and a desire to play for them was also noted. Two final features of the environment were *honesty*, when team members challenge one another on behaviours below or outside of the cultural standards of the team, and taking personal *responsibility*, whereby players reflect honestly and take responsibility for their own actions.

Both the presence of *constructive conflict* (i.e., frank disagreements that occur to improve team performance) and the lack of *destructive conflict* (i.e., personal attacks lacking positive intent) were thought to characterise effective teams. Three aspects of communication were also highlighted; *feedback* given with the intention of improving personal and team performance, clear communication enabling an understanding of team goals, game plans, and roles (i.e., *clarity*), and minimal levels of *destructive communication* reflecting negative comments such as, moaning and snide remarks.

A multidimensional view of understanding was also discussed. This involved *understanding of team members' personalities* dovetailed with the insight to how best communicate and support their peers. This closely resembled *leaders' understanding of players' personalities* which was concerned with the coach and captain having individualised knowledge of their players enabling optimal communication and the ability get the most out of their followers. However, understanding cut across more than just the understanding of personalities, it also included in-depth *knowledge of team members' "games"* or styles of play and their strengths and weaknesses. In addition, a well-developed inter-personal knowledge or shared understanding of how the team should play was noted (*team mental models*). Somewhat related to clarity concerning team mental models was a *shared clarity regarding the roles* and responsibilities of other players on the team.

The most central feature of the cricket experts' construal of team effectiveness emphasised leadership. More specifically, that the coach and captain were inspirational and passionate about their approach to cricket (*inspirational vision*), and that the *captain leads by example*, role modelling the team's culture and values. Although role modelling was exclusively linked to the captain, the importance of the *coach—captain relationship* was stressed, as this facilitated cohesive leadership for the team.

One interesting paradox captured within the model of ETI is *unique characters*. These individuals were viewed as being extremely talented, frequently making large contributions to team performances, yet simultaneously having the potential to substantially disrupt team functioning. Nevertheless, when teams were successful and effective there were a number of observable characteristics. These included: a *lack of cynicism*, in that players were open to new ideas and change; *celebrated success*, both individual and team success; generally spent time together as a collective not in cliques (*togetherness*) and offered *encouragement and enthusiasm* in the field whatever the situation.

The Current Project

While the aforementioned model of ETI offers a contextually relevant conceptualisation of teamwork (and the theoretical basis for measurement development), a suitable measure remains absent and without which we are unable to identify the aspects of teamwork of most importance. It should also be apparent that our conceptualisation, like most others, is highly multidimensional in nature. This amplifies the inherent challenge for the researcher working in high performance scenarios. In such situations access to participants and the allocation of time for questionnaire completion is typically limited. Additionally, the orthodox approach to measure development involving multiple items per factor becomes problematic due to perceived participant burden (this was also a very real concern for the

fundlers of this project, the ECB). As a result, we adopted a new paradigm to design and validate a multi-construct, single-item based inventory that can be used for research, evaluation, and quality improvement purposes. Moreover, our inventory is completed by key members of the leadership team as opposed to all team members. We then use this new measure to profile more and less effective cricket teams, generating the first sports data concerning the hypothesised relationship between teamwork and team effectiveness. Our use of multiple complimentary indicators of team effectiveness meets recent calls within the group dynamics literature for such an approach (e.g., McEwan & Beauchamp, 2014; Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017). Furthermore, we outline theory refinement and valuable practical information regarding the relative importance or “biggest hitting” features from the ETI model. A unique feature of this project was our use of pattern recognition analyses, a state of the art machine learning technique from bioinformatics. Consequently, we offer a new paradigm that future researchers may wish to follow when developing measures of highly multidimensional constructs that need to be administered under time constraints.

Study 1

A fundamental aspect of the project, represented by Study 1, was the development of relevant measures with adequate content validity. To this end, a single item capturing the essence of the conceptualisation of each component in the ETI model and relevant team effectiveness items were necessary.

Essential Team Ingredients. Where possible these were based on items procured from the previous literature (e.g., the trust in the leader item, *All team members trust and respect the coach* was derived from McAllister, 1995; and Dirks, 2000). However, when there was no existing measure (e.g., for coach-captain relationship), or items currently available were not fit for purpose, participant narratives from the interviews conducted in Chapter 2 facilitated

appropriate wording for these items. According to Dunn, Bouffard, and Rogers (1999), this process helps improve the likelihood that items will be relevant to future inventory users. The subsequent 27-item Inventory of Essential Team Ingredients (IETI; see Appendix E) was reviewed by three academics who examined the relevance and practicability of the items from a research perspective, and three individuals with a background in cricket who examined the relevance of the items to cricket. Only minor amendments were made to the wording of items.

Team Effectiveness. Typically, within the sport psychology literature team effectiveness has been assessed via an over reliance on team performance; specifically, team outcomes (e.g., win/loss ratio). Although an objective measure, Ward and Eccles (2006) question the extent to which performance metrics accurately capture the nuances of performance differences between teams. Consequently, a more holistic perspective embodying whether a team achieved its performance-oriented outcome (i.e., a win) as well as *how* the team interacts to achieve said outcome (Salas et al., 2005) is superior. Evident within organisational research (e.g., Cohen & Bailey, 1997), multi-faceted approaches to team effectiveness capture performance outcomes or behaviours (Beal, Cohen, Burke, & McLendon, 2003), cognitive states (e.g., efficacy; McEwan & Beauchamp, 2014), or affective states (e.g., satisfaction; Cohen & Bailey). Drawing from this broad and comprehensive approach we operationalised team effectiveness via four distinct but overlapping constructs. First, team performance reflected by the mean number of points awarded per match across the 2015 cricket season. Second, self-rated team effectiveness efficacy representing teams' perceptions of their own ability to work together to produce results. Third, self-rated teamwork was captured as research contends that the combination of a number of processes (i.e., teamwork) enables a team to convert the resources available to them into valued outcomes (e.g., Marks et al., 2001; McEwan & Beauchamp, 2014) which may amount to more than the constituent parts (individuals) comprising the team. Thus, a collection of expert

cricketers may only be an expertly performing team if they utilise these processes effectively. Self-rated teamwork reflected the notion of the team being greater than the sum of the parts or 'value-addedness'. And fourth, McEwan and Beauchamp (2014) suggest that behaviour is an important indicator of team effectiveness and given the potential for self-reported measures to be liable to self-presentation bias, it was optimal to include a criterion measure that was informant-rated by individuals with a more objective view of the team. To this end, informant-rated team effectiveness behaviour was also assessed. By employing this relatively unique approach we were able to move beyond a reliance on win/loss outcomes and self-report sources of data, both shortcomings of much of the existing sports-oriented group dynamics literature.

In order to formally assess (and if needed enhance) the content validity of the IETI items as well as criterion team effectiveness items, we borrowed procedures advocated by Dunn et al. (1999).

Method

Participants. Eighteen expert judges (male $n = 11$, female $n = 7$; $M_{age} = 34.22$, $SD = 11.24$) participated in this phase of the research. The sample consisted of six level four cricket coaches (the highest ECB cricket coaching award possible), six elite players (professional males, and females involved in the England pathway), and six sport psychologists involved in professional cricket. This sample had a combined experience of nearly 300 years working in, or playing cricket at the highest level ($M_{individual\ experience} = 15.89$, $SD = 9.59$), thus were considered to have adequate familiarity with the concepts being assessed.

Procedures and Measures. In order to optimise comprehension of the single item measures of the multiple components of the model of ETI, a preceding and underpinning feature of the instrument was an educational workshop. Whilst unorthodox, this approach has

been successfully used in previous studies to increase the accuracy of participants' self-reporting with single integer scores rather than the more lengthy and intrusive multi-item inventories (e.g., Hardy, Woodman, & Carrington, 2004; Thomas, Hanton, & Jones, 2002). Consequently, we provided a 15-minute training session where participants learned about the model of ETI; each component was introduced and defined before offering a holistic view of how the components related to one another. An educational booklet acted as a reference point during this workshop (see Appendix D). Furthermore, in addition to the 27 single items, the associated definitions of the components were included on the measure. Participants read each definition in turn, then the corresponding item, and provided their ratings for match and clarity before examining the next item. Following institutional ethical approval for the project and acquiring informed consent, we approached judges via email to arrange a suitable time for a face-to-face meeting. Judges then rated the extent to which each item matched the accompanying construct definition (1 = *poor match* to 7 = *excellent match*), and the extent to which each item was clear and easily understood (1 = *totally unclear* to 7 = *extremely clear*). They were also encouraged to provide further comments regarding the wording of construct definitions and items (cf. Dunn et al., 1999; MacKenzie, Podsakoff, & Podsakoff, 2011).

In line with the previously outlined multidimensional conceptualisation of team effectiveness, the expert judges rated the relevance and clarity of three team effectiveness efficacy beliefs using the same protocol as described above. As Study 1 was concerned with the development of measures suitable for self and informant rating (i.e., the constructs of self-rated team effectiveness efficacy, informant-rated team effectiveness behaviour, and self-rated teamwork), the objectively operationalised team performance was excluded from this particular investigation.

Results and Discussion

A series of familywise-error adjusted univariate F tests indicated no significant differences across coaches', psychologists', and players' ratings. Table 3.1 contains overall descriptive statistics for each item, as well as the number of qualitative comments received per item. The percentage of ratings that were scored five (*good match/very clear*) or above, and Aiken's (1985) item-content validity coefficients (V) are also detailed in Table 3.2. The V coefficient is calculated as $V = S / [n (c-1)]$ where S is the sum of each individual rating (r) of an item minus the lowest integer value (1 in this instance), n is the number of judges (18), and c is the number of successive integers (7). Values of V can range between 1 and 0, where 1.0 indicates that all judges gave the highest possible score on the rating scale. Computed V values (for both the match and clarity of each item) were compared to a right-tailed binomial probability table provided by Aiken (1985) to determine statistical significance.

The mean ratings provide initial evidence for the clarity and content relevance of the items; all items had mean values equivalent to a *good match* and *very clear* or better. The percentage scores revealed a very high degree of consistency of judges' appraisal of the items with very few ratings consistently below five. Considering Aiken's (1985) content validity V coefficients, all except one item (8d – team mental models) from the IETI were statistically significant ($p < .01$; Dunn et al., 1999). By revisiting the original interview data we were able to effectively reword the item content (see Appendix C for original and modified items). One team effectiveness item (*Sum of parts*, see Table 3.2) was flagged and received detailed instructions to improve the clarity of the question. As far as the qualitative feedback is concerned, all except one item received at least one comment. This feedback complemented the quantitative analyses aiding the refinement of individual items if warranted. One upshot of this process was the creation of 4 new items that clearly specified the source of leadership (i.e., coach or captain).

In sum, analysis of the content validity data suggests that the items had noteworthy validity; the *V* coefficient—a more robust measure of validity (Dunn et al., 1999)—revealed only one non-significant value. Moreover, we are confident that the edits made in response to the comments provided further enhanced the items on the IETI and the criterion team effectiveness items. In all, the vast majority of items remained substantially unchanged although some additional, more specific items were created. Consequently, 31 IETI items plus three team effectiveness items were brought forward to main study that continued validation by focusing on the reliability and predictive validity of the data collected using the IETI. The findings from Study 1 also reinforced our confidence in the criteria team effectiveness items and educational workshop which was retained as an integral part of the IETI.

Study 2

As the IETI is comprised of 31 single-item measures, commonly used approaches (e.g., internal consistency, factor analyses) to developing a psychometric understanding of the tool were not possible. Nevertheless, issues surrounding reliability and validity are of fundamental importance for measurement development. Accordingly, one of the purposes of Study 2 was to generate an understanding of the inter-rater reliability and predictive validity of data gleaned from the items of the IETI. Study 2 also afforded us the opportunity to address our primary research question concerning the relationship between teamwork and team effectiveness, and the most important factors of teamwork for team effectiveness.

Method

Participants. Thirty-two county cricket teams (16 female, and 16 male) participated in this study. Respondents from each team consisted of two coaches and one player (primarily the team captain), resulting in 92 participants (61 coaches and 31 players).

Table 3.1. Content validity IETI item descriptive statistics

	Total match				Total clarity				No. of comments
	<i>M</i>	<i>SD</i>	% 5-7	<i>V</i>	<i>M</i>	<i>SD</i>	% 5-7	<i>V</i>	
1a Vision	5.56	1.29	88.89	.76**	5.78	.94	94.44	.80**	8
1b Values	5.78	1.11	88.89	.80**	6.06	1.00	94.44	.84**	4
2a Safe play	5.78	1.11	88.89	.80**	5.78	1.11	83.33	.80**	11
2b Safe speak	6.17	.99	94.44	.86**	6.44	.92	94.44	.91**	4
3a Trust comp.	6.39	.92	94.44	.90**	6.22	.88	94.44	.87**	6
3b Trust intent.	5.94	1.11	94.44	.82**	6.06	1.11	94.44	.84**	4
3c Trust leader	5.28	1.41	61.11	.71**	5.39	1.33	72.22	.73**	9
4 Challenge	5.67	1.19	83.33	.78**	5.39	1.46	72.22	.73**	11
5a Con. conflict	6.00	.91	94.44	.83**	5.94	1.06	88.89	.82**	7
5b Des. conflict	5.56	1.69	83.33	.76**	6.00	1.08	94.44	.83**	4
6 Responsibility	5.89	1.28	83.33	.81**	5.72	1.23	88.89	.80**	6
7a Comm. Fb.	5.72	1.49	83.33	.79**	6.00	1.19	88.89	.83**	6
7b Clarity	6.56	1.04	94.44	.93**	6.72	.57	100.00	.95**	0
7c Dest. comm.	5.22	1.80	72.22	.70**	5.89	1.18	77.78	.81**	6
8a Personality	6.11	.96	88.89	.85**	5.89	1.32	83.33	.81**	5
8b Leader und.	6.61	.50	100.00	.94**	6.22	1.17	88.89	.87**	6
8c Und. games	5.72	1.41	88.89	.79**	5.61	1.61	77.78	.77**	7
8d TMMs	4.89	1.75	66.67	.63	5.06	1.70	72.22	.65*	8
8e Und. roles	6.17	.92	94.44	.86**	5.83	1.47	88.89	.81**	6
9a Inspirational	6.17	.79	100.00	.86**	6.22	.73	100.00	.87**	3
9b Lead by eg.	6.22	1.17	94.44	.87**	6.22	1.26	94.44	.87**	2
9c Coach-capt.	6.28	.89	100.00	.88**	6.50	.79	100.00	.92**	3
10 Unique chs.	6.00	1.08	94.44	.83**	5.72	1.23	83.33	.79**	3
11a Cynicism	6.11	1.02	94.44	.85**	6.28	.89	94.44	.88**	2
11b Celebrate	6.33	.84	100.00	.89**	6.56	.62	100.00	.93**	2
11c Together	5.33	1.64	77.78	.72**	5.61	1.38	77.78	.77**	6
11d Fielding	5.78	1.11	83.33	.80**	5.78	1.06	88.89	.80**	6

Note. Safe play = Safe to play, Safe speak = Safe to speak, Trust comp. = Trust in the competence of team members, Trust intent. = Trust in the intention of team members, Con. conflict = Constructive conflict, Des. Conflict = Destructive conflict, Respons. = Responsibility, Comm. Fb. = Communication- feedback, Destr. comm. = Destructive communication, Personality = Understanding of team members' personalities, Leader und. = Leader understanding of personalities, Und. games = Understanding of team members' games, TMMs = Team mental models, Und. roles = Understanding team members' roles, Lead by e.g. = Leads by example, Coach-capt. = Coach-captain relationship, Unique chs. = Unique characters, Cynicism = Lack of cynicism, Celebrate = Celebration of success, Together = Togetherness

Table 3.2. Content validity team effectiveness item descriptive statistics

	Total match				Total clarity				No. Of comments
	<i>M</i>	<i>SD</i>	% 5-7	<i>V</i>	<i>M</i>	<i>SD</i>	% 5-7	<i>V</i>	
1 Work together	5.72	1.07	83.33	.79**	5.72	1.18	83.33	.79**	5
2 Respond pressure	5.61	1.09	77.78	.77**	5.78	.81	94.44	.80**	1
3 Sum of parts	5.39	1.42	88.89	.73**	5.00	1.78	66.67	.67*	7

** Denotes significance $p < .01$

* Denotes significance $p < .05$ (Aiken, 1985)

Note. Work together = In matches the players work together effectively as a team
Respond pressure= The team responds positively and effectively to challenging circumstances
Sum of parts = To what extent do team performances exceed the combined talent of the individual players?

All participants were required to have been involved with the team throughout the 2015 season. Participants from male teams were all first-class cricket full-time professional cricketers or coaches, and those from female teams, although not full-time professionals, were those at the highest level of domestic cricket in the UK and included a number of international and part-time professionals. In keeping with recruitment of those at the highest level of the game, it was also considered appropriate to sample from the most prestigious formats of male and female cricket. The four-day County Championship is the highest level of male domestic cricket in England and Wales. Given that female domestic cricket in the UK does not include a multi-day competition, the highest level of domestic cricket is the One-Day Championship, involving a 50-over format of the game. The recruitment of coaches and captains was purposeful to offer differing perspectives on team functioning from those well informed.

Measures.

Compositional variables. Previous literature has highlighted the contribution of compositional variables such as the turnover of team members and personality composition to team effectiveness (e.g., Mathieu, Tannenbaum, Donsbach, & Alliger, 2014). It was necessary to capture such compositional variables in order to provide a baseline from which to compare the relative contribution of the IETI to the accurate prediction of effective teams. These descriptive items included the number of new players, junior and senior players, players leaving, team-oriented players, individual oriented players, informal leaders, and disruption to the team caused by injury.

Inventory of essential team ingredients (IETI). The 31-item inventory (alongside the educational workshop) developed in Study 1 was utilised to assess the overall functioning of each team. This inventory was based upon the model of ETI, with a single-item developed to measure each sub-component of the model. The stem, *Thinking about your team last season,*

please rate the extent to which you agree with the following statements, preceded the items which were completed using a 1 (strongly disagree) to 7 (strongly disagree) Likert type response scale (see Appendix E for the final IETI and team effectiveness items).

Team effectiveness.

Team performance. As an objective measure of team performance, the average number of points scored per game in the 2015 County Championship season was calculated for each team. Given that the number of points available per game differ across the male and female versions of cricket, average points scored were divided by the maximum number of points available for each team per game (24 and 18, respectively) in order to combine the data across sex.

Self-rated team effectiveness efficacy. In order to assess each teams' perception of their ability to work together to produce results participants answered two items on a 0 (*strongly disagree*) to 100 (*strongly disagree*) Likert-type scale: *In matches the players work together effectively as a team*, and *The team responds positively and effectively to challenging circumstances*. Participants were instructed to consider how well the team interacted and combined to produce results, rather than base their answers solely on the outcome of matches. As the two items were strongly correlated ($r = .78, p > .01$), mean scores for both items were calculated across items and respondents to represent the team score.

Informant-rated team effectiveness behaviour. The same items, response scale, and scoring as that for team effectiveness efficacy were utilised to assess informant-rated team effectiveness behaviour.

Self-rated teamwork. Participants were asked: *To what extent do team performances exceed the combined talent of the individual players?*, responding on a nine-point Likert scale from -4 (*The team produces performances that are worse than you would expect given the*

talent of the individual players) to +4 (*The team produces performances that are better than you would expect given the talent of individual players*). The average of this item across the respondents from each team was taken as the team score.

Informant-rated teamwork. The same items, response scale, and scoring as that for self-rated teamwork were utilised to assess informant-rated teamwork.

Procedures. Once ethical approval had been granted, initial contact with participants was made at the end of the 2015 cricket season through key personnel from the ECB and county cricket. A follow-up telephone conversation with each prospective participant provided an opportunity to explain the aims, objectives, and potential implications of the research, as well as formally invite teams to participate. In all instances contact was made with the head coach initially in order to gain subsequent access to assistant coaches and players, once the head coach had consented to the team taking part.

As in Study 1 all participants were visited in person and received an educational workshop and booklet regarding the model of ETI. Not only did this serve to provide familiarity with the concepts being measured, it also provided teams with concrete information they could utilise in the assessment and subsequent improvement of their own team functioning after participation in the study. Although in most instances all members from one team (e.g., head coach, assistant, and captain) received the educational component collectively, they completed all inventories independently. The educational workshop was identical to that used in Study 1.

The compositional data and IETI were completed first, with reference to the 2015 season, and then returned to the researcher before completing measures of team effectiveness. A short break between inventories was used to brief the participants on the nature of the outcome measures and underscore the importance of response accuracy. This process served

to ensure that participants only provided ratings for teams they were confident to do so, whilst also reducing common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Participants subsequently completed the measures of team-effectiveness in reference to their own team for the 2015 season (i.e., team effectiveness efficacy and teamwork), and then completed the informant-rated measure for between three and five other teams they felt confident rating. Participants were instructed that this confidence should be based on the number of times they encountered that team in the season, and the extent to which they had analysed team strengths and weaknesses in preparation for those matches. Respondent confidence was recorded (out of 100) via how confident they were in their assessment of that particular team; teams with confidence ratings below 50% were omitted from further analyses. We sought to reduce respondent overconfidence bias by advising participants that they should rate not on the basis of being complimentary, nor on the basis of being critical of their competitors, but on the basis that they could reasonably justify their ratings if they were asked to do so. Although justification was not formally requested, Hagafors and Brehmer (1983) state that this is an effective means of ensuring respondents respond analytically, rather than intuitively.

Preliminary data preparation.

Inter-rater reliability. To assess the degree to which participants provided consistency in the ratings of their own team on the IETI, inter-rater reliability was calculated using intraclass correlation coefficients (ICC) (cf. Hallgreen, 2012). For each team the ICC calculated between coach, assistant coach, and captain using a two-way, mixed effects model with absolute agreement. As all teams were rated by multiple raters and the average of their ratings was used in the final analysis, average measures ICCs were suitable (Hallgreen, 2012).

Normalisation of non-reciprocal informant-ratings. Two potential sources of confounding are applicable to the ratings of all informant provided data; reliability across

raters and individual differences in the severity of judgements made by the raters (e.g., some raters can be more liberal than others). It is apparent that the utilisation of multiple informants can result in some discrepant data (Achenbach, McConaughy, & Howell, 1987). Hence evaluating inter-rater reliability is of relevance. Unfortunately for informant-rated team effectiveness behaviour, as our informants rated different combinations of teams (i.e., one participant might rate teams 3, 4 and 7, with another participant rating teams 1, 3, and 8, etc.), we were unable to calculate standard inter-rater reliability statistics. We were presented with the problem of various informants rating different teams whilst also interpreting the criteria for ratings in different ways. Therefore, we developed a new procedure to calibrate informant ratings and normalise the data for more/less liberal ratings, thereby enhancing its reliability. The procedure, as described below, provided an indication of how conservative each rater is relative to each other rater for that team.

First, the informant raters' scores for each item were standardized across that team (i.e., Z scored). This allowed for the comparison of an individual's rating of an item relative to the other informant ratings of that same item. Second, the mean of each informant raters' standardized scores across all the teams that they rated was then calculated. This provided an indication of how liberal or conservative each informants' ratings were overall. A positive mean value indicated an overall liberal approach to rating, and a negative value a conservative approach. Third, teams' original ratings were then adjusted by the mean standardized value calculated for each rater in order to adjust for the respective conservatism/liberalism using the following equation: $(Team\ 1 \times [1 - Z_{mean}])$. As an example, if a rater had a mean Z score of 1 (a liberal rating) the rating for this team gets reduced to become 0. If the rater had a mean Z score of 0 (the mean rating) then the team's rating does not get adjusted. A mean Z score of -1 would indicate that the rater was conservative, therefore the team's rating would be increased

to 0. Fourth, the mean of all adjusted informant ratings was then taken for each team (a more detailed illustrative example is available in Appendix G).

Data analysis strategy. Traditional statistical approaches researchers might typically use to ascertain which variables in the ETI model discriminate between effective and less effective teams would likely involve either the use of MANOVAs or discriminant function analyses (DFA). However, the present data set is considered “wide” in that there is a greater number of variables under investigation (40) than there is teams (32). This precluded the use of either MANOVAs or DFAs. In order to navigate around these barriers, pattern recognition analysis was used to identify the variables which could differentiate between effective and less effective cricket teams.

Pattern recognition analysis originated from bioinformatics and was designed to solve the problem of classifying objects based on the features they possess (see Duda, Hart, & Stork, 2001 for an example). This approach has been successfully applied in research on chemical biology (e.g., Griffin, 2003), speech recognition (e.g., Morrison, Wang, & De Silva, 2007), and cognitive neuroscience (e.g., Downing, Wiggett, & Peelen, 2007). Essentially, computer algorithms utilising iterative estimation procedures are used to analyse a large number of features to find those that distinguish between two different classes of objects. The data within the present research consisted of 40 features (31 IETI items and nine compositional variables). Effective and less effective teams, as classified by one of the five team effectiveness criterion variables (team effectiveness represented by team performance, self-rated effectiveness efficacy beliefs, self-rated teamwork, informant-rated effectiveness, and informant-rated teamwork), constituted the two classes of objects we wished to distinguish between. The median score for each outcome variable was calculated, and teams whose scores were below the median split were classified as less effective (1), and teams whose scores fell above the median split were classified as effective (2). Thus, for each

criterion variable, 16 teams were categorised as effective and 16 were categorised as less effective. Table 3.3 provides details of these classifications, demonstrating that only 18 of the 32 teams were consistently classified as effective or ineffective across all outcome criteria.

The remaining 14 teams varied in their classification depending on the criteria applied.

Table 3.3. Categorisation of teams into ‘effective’ or ‘less effective’ based on the various outcome variables

Team	Team performance	Self-rated team effectiveness	Self-rated teamwork	Informant-rated effectiveness	Informant-rated teamwork	Frequency categorised 'effective'
1	2	2	2	2	2	5
2	1	1	1	1	1	0
4	1	2	2	1	2	3
6	2	2	2	2	2	5
7	1	1	1	1	1	0
8	1	2	1	2	2	3
9	1	1	1	1	1	0
10	1	1	1	1	1	0
11	2	2	2	2	2	5
12	2	2	2	1	1	3
13	2	2	1	2	1	3
14	2	1	1	2	2	3
15	1	1	1	1	1	0
16	1	1	1	2	2	2
17	2	2	2	2	2	5
18	2	2	2	2	2	5
19	1	1	2	1	1	0
20	2	2	2	2	2	5
21	2	1	1	1	1	1
22	2	2	1	1	1	2
23	1	1	2	2	2	3
24	1	2	2	1	1	2
26	2	2	2	2	2	5
27	1	1	1	1	1	0
28	2	2	2	2	2	5
29	1	1	1	2	2	2
30	2	1	2	1	1	2
31	1	1	1	1	1	0
33	1	1	1	1	1	0
34	2	1	1	1	1	1
35	1	2	2	2	2	4
36	2	2	2	2	2	5

Note. 1 = ‘less effective’ and 2 = ‘effective’.

Shaded rows highlight the teams who were consistently classified as ‘effective/less effective’ across all outcome criteria.

Waikato Environment for Knowledge Analysis (WEKA; Hall et al., 2009), a machine learning workbench that offers a wide range of state-of-the-art data pre-processing, classification and feature selection algorithms (Witten, Frank, & Hall, 2011), was adopted for this purpose. All data were standardized within sex before being included in the pattern recognition analyses. To establish the features that contribute to the classification of effective/less effective teams and improve model accuracy, feature selection algorithms were interpreted in the context of individual feature weightings. Although a number of different procedures can be used for feature selection, three were used in the present analyses: Fast Correlation Based Filter (FCBF; Yu & Liu, 2003), Correlation Attribute Evaluation (Hall, 1999), and Relief-F (Kira & Rendell, 1992). Weightings close to zero were taken to indicate that a particular feature contributed little to the process of classification. Therefore, features with low ratings that were not ranked of high importance in feature selection were removed from the SVM model. Feature weightings, together with the accuracy rating from subsequent, repeated SVM classifier models were used to inform decisions about feature retention.

Initial analyses employed three different classification algorithms; support vector machine (SVM; Burges, 1998), nearest neighbor (1-nn; Duda et al., 2001), and decision tree classifier (J48; Breiman, Friedman, Olshen & Stone, 1984) to evaluate the accuracy of each predictive model and weight of each feature. All features were entered into the analysis and 32 fold cross-validation was applied to partition the data-set for training and testing. This approach diverges from the default WEKA setting of 10 folds, but is recommended for small sample sizes (Klement, Mamlouk, & Martinez, 2008). This process, which essentially amounts to a leave-one-out cross-validation, retains a single randomly selected team as the validation data for testing the model, and the remaining 31 subsamples are then used as training data. The team selected for validation then changes and the process is repeated until exhaustion. There was a degree of overlap in the features selected and the accuracy of the

models obtained from the various classifiers, however the predictive performance of SVM was consistently more accurate than the 1-nn and J48 algorithms.

Results

Inter-rater reliability. The mean average ICC across all teams ($M = .78$, $SD = .11$) indicated excellent consistency of rating between respondents on the IETI (Cicchetti, 1994).

Pattern recognition analysis. Descriptive statistics for all IETI items and the bivariate correlations with the outcome variables are presented in Table 3.4. Positive bivariate correlations between outcome variables are reported in Table 3.5 and offer initial support for the validity of these measures.

The process of feature selection resulted in 13 features retained in the performance model, 12 in the self-rated team effectiveness efficacy model, seven in the self-rated teamwork model, and 12 features retained in the informant-rated effectiveness model. Table 3.6 details individual feature weightings of the refined models for each criterion. Confusion matrices for each model are presented in Tables 3.7 through to 3.10. As the classification variables reflect differing constructs—an objective score of performance, self-rated team effectiveness efficacy and teamwork, and informant-rated effectiveness—it should come as no surprise that there were some notable differences in the accuracy and composition of features across the predictive models.

Team performance. The SMO algorithm correctly classified 62.5% of the instances of team effectiveness represented by average points scored when all features of team effectiveness were entered into the model. However, following feature selection and subsequent removal, the optimum subset of 13 features was able to correctly classify high or low points scoring teams with 87.5% accuracy. The feature weightings in Table 3.6 suggest that effective teams were characterised as having a larger number of senior players and higher trust in the intention of team members, as well as fewer injuries and less coach inspiration.

Table 3.4. Means and standard deviations, and bivariate correlations with outcomes for all descriptive and IETI items

Feature	Mean	SD	Performance	Self-rated team effectiveness efficacy	Self-rated teamwork	Informant-rated effectiveness	Informant- rated teamwork
A. Injury	3.36	1.37	-.19	.01	.13	.08	-.04
B. New players	2.27	1.31	.23	-.03	-.03	-.15	.10
C. Junior players	5.18	2.32	-.36*	-.36*	-.25	-.09	-.15
D. Players leaving	1.83	1.63	-.38*	-.12	-.08	.01	-.19
E. Senior players	5.24	2.22	.32	.24	-.09	.08	.01
F. Team players	7.78	2.88	.32	.32	.10	.22	.14
G. Individual players	3.03	1.09	-.28	-.40*	-.20	-.21	-.05
H. Informal motivator	3.58	1.65	.18	.33	.11	.40*	.17
I. Informal hard work	4.75	1.77	-.01	.18	-.04	.48**	.18
1. Vision	5.08	1.08	.42*	.58**	.57**	.27	.18
2. Values	4.60	1.22	.07	.31	.43*	.31	.11
3. Safe to play	4.68	1.20	.27	.42*	.49**	.31	.19
4. Safe to speak	4.08	0.96	.26	.39*	.44*	.29	.17
5. Trust competence	4.86	0.88	.33	.70**	.62**	.36*	.26*
6. Trust intention	5.17	0.68	.56**	.67**	.62**	.24	.21*
7. Trust coach	5.14	1.68	.07	.14	.40*	.02	.07
8. Trust captain	5.46	1.23	.41*	.32	.33	.26	.28*
9. Challenge	3.91	0.99	.30	.55**	.41*	.43*	.27**
10. Constructive conflict	4.00	0.93	.26	.43*	.38*	.38*	.18
11. Destructive conflict	3.83	1.05	-.23	-.39*	-.41*	-.26	-.18
12. Responsibility	4.64	0.89	.31	.62**	.52**	.27	.21*
13. Comm. feedback	4.10	0.92	.47**	.47**	.43*	.22	.19
14. Comm.clarity	4.88	0.99	-.02	.23	.45*	.21	.02
15. Destructive comm.	3.94	1.28	-.23	-.34	-.52**	-.27	-.23*
16. Und. personality	4.63	1.01	.33	.44*	.32	.25	.14
17. Coach understanding	5.01	1.21	.04	.09	.40*	.03	.02
18. Capt. understanding	5.00	1.09	.36*	.49**	.49**	.26	.28*

19. Understanding games	4.43	0.94	.12	.46**	.42*	.37*	.13
20. Team mental models	5.21	0.76	-.03	.36*	.38*	.26	-.02
21. Understanding roles	4.73	0.88	.12	.55**	.60**	.34	.11
22. Coach inspiration	4.91	1.62	.01	.11	.44*	.05	.06
23. Captain inspiration	5.08	1.45	.48**	.36*	.35	.23	.39**
24. Lead by example	5.42	1.35	.33	.39*	.47**	.23	.33**
25. Coach-capt. r'ship	5.39	1.66	.25	.24	.41*	.09	.24*
26. Unique characters	5.09	1.04	-.30	-.12	-.23	.00	-.13
27. Number unique	2.53	0.92	-.06	-.06	-.20	.05	-.11
28. Lack of cynicism	5.38	0.73	.43*	.23	.38*	-.04	.16
29. Celebration	5.90	.78	.34	.55**	.36*	.40*	.30**
30. Togetherness	4.66	1.04	.06	.33	.24	.40*	.17
31. Fielding	4.29	1.37	.53**	.58**	.57**	.37*	.46**

** Denotes significance $p < .01$

* Denotes significance $p < .05$

Table 3.5. Means, standard deviations, and bivariate correlations of all outcome variables ($N = 32$)

Outcome	Mean	SD	1	2	3	4
1. Average points	.56	.17				
2. Perceived effectiveness	63.35	14.38	.58**			
3. Perceived teamwork	.33	1.42	.42*	.70**		
4. Informant-rated effectiveness	43.95	18.74	.20	.50**	.35*	
5. Informant-rated teamwork	0.00	1.00	.59**	.51**	.37**	.90**

** Denotes significance $p < .01$

* Denotes significance $p < .05$

Table 3.6. SMO classification models for each classification variable with corresponding percentage accuracies and feature weightings

	Team performance		Self-rated team effectiveness efficacy		Self-rated teamwork		Informant-rated team effectiveness		Informant-rated teamwork	
Percentage accuracy	87.50		87.50		90.63		90.63		87.50	
Features and relative weightings	Injury	-1.2	New players	0.67	Vision	0.76	Injury	-0.12	Informal hard work	0.97
	Players leaving	-0.81	Players leaving	-0.8	Trust competence	1.18	New players	0.33	Trust competence	0.38
	Senior players	1.44	Team players	0.71	Trust intention	1.2	Players leaving	-1.16	Trust intention	0.24
	Informal hard work	0.72	Selfish individuals	-0.59	Trust in captain	0.96	Informal motivators	0.44	Honest challenge	1.41
	Trust competence	0.99	Vision	0.72	Und. Roles	1.34	Informal hard work	0.76	Destr. Conflict	-0.79
	Trust intention	1.07	Trust competence	1.48	Coach inspiration	0.9	Honest challenge	1.46	Destr. Comm.	-0.49
	Honest challenge	-0.83	Responsibility	0.68	Fielding	1.24	Destructive conflict	-1.32	Und. Roles	0.50
	Destr. Comm.	0.83	Clarity	0.89			Captain und.	0.37	Captain inspiration	0.81
	Captain und.	0.99	Destr. Comm.	0.86			Und. Roles	0.34	No. of unique chs.	-0.35
	Und. Roles	0.49	Und. Games	1.17			Captain inspiration	0.73	Celebration.	0.74
	Coach inspiration	-0.88	Captain inspiration	0.88			No. of unique chs.	-0.63	Togetherness	0.82
	Captain inspiration	0.75					Celebration.	1.07	Fielding	0.79
	Fielding	0.68								

Note. Destr. Conflict = Destructive conflict, Destr. comm. = Destructive communication, Captain und. = Captain understanding of personalities, Und. games = Understanding of team members' games, Und. roles = Understanding team members' roles, No. of unique chs.= Number of unique characters, Celebration = Celebration of success

The confusion matrix in Table 3.7 reveals that the number of true positives and true negatives were far greater than the number of false negative or false positive compounds; one less effective team was incorrectly classified as effective, yet three effective teams were incorrectly classified as less effective.

Table 3.7. Confusion matrix for team performance

		Predicted class	
		High scoring (effective)	Low scoring (less effective)
Actual class	High Scoring	13	3
	Low scoring	1	15

Self-rated team effectiveness efficacy. Initially teams were correctly classified with 65.6% accuracy when all features from the IETI were entered into this predictive model. Following the removal of features with low weightings, the optimum subset of 11 features correctly classified teams with 87.5% accuracy. In the current analysis higher trust in competence and understanding of team members' games emerged as strong markers of effective teams. Table 3.8 reveals that only four out of the 32 teams were incorrectly classified; one as effective when they were in fact perceived, by themselves as relatively less effective, and three as less effective when they were perceived to be effective.

Table 3.8. Confusion matrix for self-rated team effectiveness efficacy

		Predicted class	
		Self-rated effective	Self-rated less effective
Actual class	Self-rated effective	13	3
	Self-rated less effective	1	15

Self-rated teamwork. The criterion variable of perceived teamwork--the extent to which members regarded their team to be better than the talent they had available--produced one of the models with the highest percentage classification accuracy. Using all features resulted in teams being correctly classified as being relatively greater or less than the sum of their parts 75% of the time. The optimum subset of seven features increased the level of accuracy to 90.6%. No negative feature weightings were evident, and all emergent features shared similarly strong weightings. Notably, the weightings of understanding of one another's roles and displays of enthusiasm and encouragement in the field were particularly high. Given the high level of classification accuracy, only three teams were incorrectly classified in this model (see Table 3.9).

Table 3.9. Confusion matrix for self-rated teamwork

		Predicted class	
		Greater than the sum of their parts	Less than the sum of their parts
Actual class	Greater than the sum of their parts	14	2
	Less than the sum of their parts	1	15

Informant-rated team effectiveness. Teams were correctly classified as relatively effective or less effective by informants with 68.8% accuracy when all features were entered into the analysis. Following the removal of a number of features with low weightings, 12 features correctly classified 90.6% of teams as either effective or less effective. Effective teams were characterised by high honest challenge and low destructive conflict.

Only three teams were incorrectly classified using this optimum subset of features; two effective teams classified as less effective, and one less effective team incorrectly classified as effective (Table 3.10).

Table 3.10. Confusion matrix for informant-rated team effectiveness

		Predicted class	
		Informant-rated effective	Informant-rated less effective
Actual class	Informant-rated effective	14	2
	Informant-rated less effective	1	15

Informant-rated teamwork. Teams were correctly classified as greater or less than the sum of their parts as rated by informants with 81.25% accuracy when all features were entered into the analysis. Following the process of feature selection, and removal of those with lower weightings, an optimal subset of 12 features correctly classified teams with 87.5% accuracy. Similar to the other informant-rated criterion, this analysis revealed that teams greater than the sum of their parts were characterised by high honest challenge and low destructive conflict, and the presence of informal leaders who worked hard also made a strong contribution to classification. Table 3.11 reveals that two teams were incorrectly classified as greater than the sum of their parts, and a further two incorrectly classified as less than the sum of their parts using these features.

Table 3.11. Confusion matrix for informant-rated teamwork

		Predicted class	
		Informant-rated greater than the sum of their parts	Informant-rated less than the sum of their parts
Actual class	Informant-rated greater than the sum of their parts	14	2
	Informant-rated less than the sum of their parts	2	14

Discussion

Data collected using the IETI lend support for measure's interrater reliability. Furthermore, as teamwork features assessed by the IETI could accurately discriminate between more effective and less effective teams, we also generated initial support for the measure's predictive validity. Given the inherent differences across the four criterion variables, the composition of predictive features varied somewhat between the models. There were, however, some common features across classifiers, with elements of trust, understanding, and leadership predictive of team effectiveness across all models. When interpreting the results from each analysis it is important to keep in mind that each feature's weighting should be considered in concert with the other identified features.

Team performance. The average points model, as an objective measure of each team's performance throughout the season, represents the criterion variable of least theoretical yet most practical interest. This measure is not directly indicative of the way that a team combines or interacts to procure points, as strong individual batting or bowling performances can result in the accumulation of bonus points. Therefore, the predictive capacity of a number of group-related variables such as trust (in the competence and intention of team members) and leadership (captain understanding and inspiration) evident in this model attests to the

contribution of team functioning to overall performance. Better performing teams were also characterised as having greater stability and experience (e.g., suffered fewer injuries and players leaving, and had a greater number of senior player). Previous research has found membership stability to be positively related to team effectiveness in basketball teams (Ramos-Villagrasa, Navarro, & Garcia-Izquierdo, 2012) and one reason for this is that stable teams develop routines and trust (Pelled, Eisenhardt, & Xin, 1999).

Recent literature suggests that sports teams are characterised by shared leadership where the coach, team captain, and informal athlete leaders lead their team together (Fransen, Van Puyenbroeck et al., 2015). Our findings appear consistent with this interpretation, as having a greater number of individuals who led informally through hard work and commitment contributed to the accurate prediction of teams. However, the captain emerged as the most influential leader within the present model, as a result of strong feature weightings for both captain understanding and captain inspiration. Indeed, coach inspiration had a negative association with team performance. The findings are consistent with research regarding the transformational leadership behaviours of team captains (e.g., individualised influence and inspirational motivation; Callow, Smith, Hardy, Arthur, & Hardy, 2009), although the negative coach inspiration relationship is contrary to most current thinking concerning coach leadership (e.g., Hardy et al., 2010). This may be because if a coach is having to inspire the team it is to compensate for the shortcomings of the captain. Moreover, within the competition setting cricket captains have been found to hold primary leadership responsibility (Smith, Young, Figgins, & Arthur, 2017; Webster, Hardy, & Hardy, 2017). Indeed, research suggests that the coach is rarely regarded as the most influential or effective leader within sports teams (Fransen, Van Puyenbroeck et al., 2015).

The present results also suggest that better performing teams are built upon a foundation of trust, both in the competence of team members and in their intentions for the

best of the team. The presence of effective leadership could have a positive impact upon this trust, as previous research suggests that an inspirational leader can trigger communication processes that lead to the exchange of information upon which a team can form trust judgements (Boies, Fiset, & Gill, 2015). This in turn facilitates teams' performances. Trust in teammates may also originate from information about each individual (Mayer, Davis, & Schoorman, 1995), thus an understanding of team members' roles could contribute to the development of trust in the ability of team members, and trust that their best intention was for the team. Trust in team members has been found to be positively related to member satisfaction and team performance (De Jong et al., 2016).

In contrast to expectation, high performing teams were characterised by relatively little honest challenge (candid feedback designed to improve team functioning) but more destructive communication (rumours and moaning). This may highlight that honest feedback may only be necessary when a team is performing poorly (i.e., in order to prompt a necessary change in performance), while destructive communication is ever-present, even in effective teams. For instance, Sullivan (1993) reports that moaning can represent a form of accepting communication, enabling team members to demonstrate the capacity to listen in an understanding way and become trusted. For example, a team member might listen sympathetically to a team mate complaining about a fitness drill, or deselection.

Self-rated team effectiveness efficacy. Teams who perceived themselves as effective were marked by a greater number of individuals who were team-oriented, in addition to having fewer individually-oriented or selfish team members. A lack of self-interest is likely to promote the perception that a team is able to come together to perform effectively (Salas et al., 2005). Furthermore, similar to the performance model, teams self-rated as effective had only a few players leave, yet a greater number of new players joining the side. Although the addition of new players could arguably disrupt the stability that may contribute to team

effectiveness (e.g., Ramos-Villagrasa et al., 2012), it is common in sports teams to bring in specific new members to supplement talent and introduce innovation (Montanari, Silvestre, & Gallo, 2008). This may, in turn, contribute to a team's perception of their ability to be successful.

Effective teams also had a clear vision that their captains inspired them towards. Recent research with performance directors of Olympic sports suggests that the development of a vision is critical to the orchestration of elite performance (Fletcher & Arnold, 2011). Arguably, this shared aspiration requires a team to come together in its pursuit, rather than operate as a group of individuals. Arthur, Hardy, and Woodman (2012) suggested that inspirational motivation is closely linked to creating a vision for others, therefore it is reasonable that in the present study captain inspiration encouraged team members to adopt this shared vision for the future and work together to achieve it.

As in the performance model, the presence of effective, inspirational leadership from the captain also contributed to the development of trust in team members (e.g., Boies et al., 2015). Although only trust in competence was evident in the present model, it is perhaps unsurprising that belief in the competence of team members (similar to other-efficacy; Lent & Lopez, 2002) is a stronger predictor of the extent to which a team believes they can be successful than the belief in members' intentions. The belief in others' competence is also likely to be built through the understanding of one another's strengths, weaknesses, and styles of play (understanding games; Mayer et al., 1995).

Self-rated teamwork. Results from the teamwork model suggest that teams who consider their team performances exceed their individual talent levels have a vision for success which the coach inspires the team towards, and a foundation of trust in team members (in both competence and intention) and the team captain. Interestingly, trust may serve to facilitate a team's pursuit of their vision, as Mach, Dolan, and Tzafrir (2010) reported that

trust within teams (both in teammates, and in the leader) allowed members to work cooperatively towards achieving organisational goals. Similar to the present research, Mach et al. found trust in the leader to be less influential than trust in team members on group outcomes. However, trust in the leader was subsequently found to help shape trust in team members, which in turn affects team performance (Mach & Lvina, 2017).

An understanding of one another's' roles also contributed to the accurate classification of teams for the teamwork criterion variable. Eccles and Tenenbaum (2004) propose that the understanding of roles enables the on-field coordination necessary to produce value-added performance), this also allows players to understand their unique contribution to the team's vision (Yukelson, 1997).

Finally, coach inspiration also contributed to the accurate prediction of team effectiveness based on self-rated teamwork. Despite *captain* inspiration being predictive of team effectiveness for all other criterion variables, recent research does support the concept that athletes can be inspired by both captain *and* coach (Figgins, Smith, Sellars, Greenlees, & Knight, 2016). Perhaps for a team to combine effectively, adding value over individual talent levels, effective leadership is required from both captain and coach. In this instance, the coach appears to be responsible for inspiring the team towards the promoted vision, and the continued pursuit of this vision is facilitated by trust in the captain.

Informant-rated team effectiveness. When rated by opposition team members, effective teams were characterised by greater stability (i.e., fewer injuries and players leaving), a number of new players, and more informal leaders. Most of the predictive features present in the informant-rated model are outward-facing and observable to individuals external to a team. For example, the negative weighting of destructive conflict suggests that members of effective teams experience less personal disagreements and blame. Indeed, if members of a team were having an argument on the pitch the opposition would highly likely

consider them less effective or dysfunctional (e.g., O'Neill, Allen, & Hastings, 2013).

Similarly, the understanding of one another's roles, whilst information not explicitly available to external parties, could be garnered from watching the ways in which team members coordinate their actions effectively (e.g., Eccles & Tran, 2012).

Curiously, although honest challenge was negatively related to team performance, the perception of opposition teams was that this type of communication was a marker of team effectiveness. It could be argued that there is a self-perpetuating narrative within UK cricket that promotes honest feedback and challenge for the betterment of the team (see narratives in Chapter 2 for example). However, in reality, honest challenge is possibly a process of greatest relevance when a team is performing poorly and in need of addressing mistakes or shortcomings.

One last finding of note was the negative association between the number of unique characters on a team (i.e., particularly talented players with the potential to disrupt the team) and informant rated team effectiveness. While there might be a certain degree of tolerance from members of the team towards such characters, the data lends some weight to the widely held belief that the negative behaviours these individuals display can deleteriously effect group functioning. Indeed, this is consistent with existing qualitative research regarding the 'bad apple' or informal cancer role in sport (Cope, Eys, Schinke, & Bosselut, 2010).

Informant-rated teamwork. Arguably, it may be difficult for opposition teams to make an accurate judgement of the extent to which another team performs better than the sum of the talent it has available; however, the informant-rated teamwork model bears many similarities to the informant-rated effectiveness model discussed above. From the perspective of others, teams who performed better than the sum of their parts were characterised by greater trust, fewer destructive interactions but a higher level of honest challenge, a shared understanding of teammate roles, and an inspirational captain. As with the other informant-

rated model the features that contributed to the accurate classification of teams were outward facing. Particularly noteworthy is the presence of several indicators of team effectiveness such as the celebration of success, the extent to which the team remains together in close physical proximity, and displays of coordination when fielding.

There are also similarities between the self- and informant-rated teamwork models, suggesting that, regardless of perspective, trust in both the competence and intention of team members, a shared understanding of members' roles, the presence of inspirational leadership, and displays of unity in the field are predictive of teams who come together to perform better than the sum of their parts. This is in line with previous research that highlights the impact of trust on team performance (DeJong et al., 2016), and indeed the influential role of leadership in the development of this trust (Boies et al., 2015)

Finally, this is the only model across the analyses to feature some form of conflict, in that the more effective teams appeared to have lower levels of destructive conflict. This is not particularly surprising, given the equivocal finding that conflict (pertaining to interpersonal relationships in particular) inhibits the way in which teams manage and perform their tasks (O'Neill & McLarnon, 2018). However, conflict may not have contributed as strongly to the accurate prediction of effective teams in other models, as theory suggests that conflict management is more pertinent to the effectiveness of teams than merely the experience of conflict (e.g., Rousseau et al., 2006; LePine et al., 2008). Yet from the perspective of an opposition team, the conflict itself is a far more visible indicator of team effectiveness than any conflict management strategies that might be employed.

General Discussion

The aim of the present research was to develop a user friendly, broad-based research tool to assess team functioning in cricket. The approach taken to develop and test the inventory involved five phases of work and novel techniques, resulting in a research

instrument unlike any other currently available. Based on application of the IETI and pattern recognition analyses we established a set of features that could accurately classify effective cricket teams via a thorough and complementary operationalisation of the criterion variable, team effectiveness. Despite conceptual differences between the criterion variables, there are many similarities in the emergent features present in the various models. On the whole, effective teams according to most criteria were those that had greater stability and consistency (i.e., fewer players leaving and less injury). In addition, other than the informant rated model, elements of trust appeared fundamental to team effectiveness. Trust in others' competence was marginally more important for team effectiveness efficacy, but trust in the intentions of team members helped add value to the team (building beyond the sum of their parts, talent wise), and accordingly facilitated superior team performances across the season.

Organisational psychology has affirmed the importance of trust in establishing effective teams (e.g., De Jong et al., 2016), yet the research literature regarding trust in sports teams is currently limited. The present results provide compelling evidence for the influential role of trust in increasing team effectiveness, and the need for greater theoretical and empirical understanding of this multidimensional phenomenon in sport.

Elements of understanding were also evident in all models. The nature of this understanding was predominantly an understanding of one another's roles. Eccles and Tenenbaum (2004) suggest that clear specification of roles is essential to promote teamwork in sport, in that role clarity encourages effective information sharing in teams, enabling the production of coordinated actions. An understanding of one another's games contributed to higher self-rated team effectiveness beliefs, enabling players to coordinate their actions more effectively as observed by the informant raters. Both understanding of roles and individuals' games form the content of a team's task-related mental model (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000).

Leadership behaviours also featured within all models, with the captain's leadership being particularly prominent. Consistent with current understanding of transformational leadership in sport, a captain who understands players (individualised consideration) and inspires the team (inspirational motivation) likely facilitates team effectiveness (e.g., Callow et al., 2009). On the other hand, the influence of the coach is less clear across our various criterion variables. Given that extant research indicates that shared leadership contributes to the best team outcomes (e.g. Fransen, Van Puyenbroeck et al., 2015), in teams where the captain is particularly inspirational, there is perhaps less need for an inspirational coach.

Finally, the relatively consistent presence of observable indicators of team functioning via displays of enthusiasm and encouragement in the field, and the celebration of individual and team successes, is noteworthy. Player and coach narratives highlighted these features as markers of team effectiveness (see Chapter 2), yet whether they contribute to the development of an effective team or are merely a consequence of team effectiveness remains to be seen.

Overall, it appears that an effective team requires a degree of stability, underpinned by a foundation of shared knowledge about the team, which enables trust to develop, and members to coordinate efficiently 'out in the middle'. The team captain plays a principal role in inspiring the team and encouraging the development of trust and understanding.

Strengths and limitations

The present research makes a unique contribution to the team dynamics literature. Not only does it represent the first attempt to measure the multivariate concept of team functioning in sport, but also the means by which the inventory was developed is innovative and novel. Strengths of the research include the "user-friendly" measurement design paradigm adopted, the multidimensional operationalisation of team effectiveness and application of pattern recognition analyses. Future research would be well-advised to utilise multidimensional measures in order to provide the most holistic assessment of team

effectiveness. Indeed, Mathieu et al. (2017, p.455) advocate “a multilevel, multiple constituencies’ framework”, yet also urge researchers to consider the importance and relevance of outcomes for the particular team context studied. Indicators of efficiencies in cricket may be fundamentally different to those in rugby, or in a sport science support team, for example. However, the use of a combination of objective (e.g., performance statistics, informant-ratings) and subjective (e.g., self-report), as well as individual (e.g., performance, intention to return) and group-level (e.g., team performance, cohesion) data to assess overall team effectiveness offsets some of the limitations inherent in each measurement approach. The normalisation of informant-rated outcomes and assessment of inter-rater reliability also contribute to the robustness of our findings, and flag two aspects concerning rigour that future informant-rating based research would do well to incorporate.

As data originating from professional level sport is conspicuous by its absence in the team dynamics sport psychology literature, the present study is based on a relatively unique sample. Inevitably, at the highest levels of sport there are fewer teams. Despite securing the participation of nearly 90% of all cricket teams at the highest level of domestic cricket in the UK, it was necessary to pool male and female data. Given that recent data suggest the possibility of sex differences for group dynamic variables (e.g., Cronin, Arthur, Hardy, & Callow, 2015), our data were standardized for sex. Nevertheless, sex differences remain an issue worthy of further systematic investigation (although this would need to be conducted in other sports where there are more elite teams, or at lower levels of cricket).

The results should also be interpreted within the task-oriented context they were procured; limited generalisability outside of sports displaying segregated task interdependence (cf., Evans, Eys, & Bruner, 2012) is possible. There may well be elements of team functioning that are common across a number of team sports, however cricket represents a relatively unique team context much like baseball. Although other team sports rely far more

on interdependent acts to be successful, the current findings highlight the pertinence of team dynamics in cricket. Future research should explore these commonalities and potential differences in greater detail.

Applied implications

The findings above provide support for the presence and importance of the variables proposed in the model of essential team ingredients, as well as the interplay between these aspects. The factors not only predicted self- and informant-rated team effectiveness, but also objective team performances. Many of the components within the model are constructs beyond those which have traditionally dominated previous group dynamics research in sport (e.g., cohesion and collective efficacy; Kleinert et al., 2012), although they are not absent from the organisational team effectiveness literature. From a practical perspective, the IETI can be employed as a screening instrument providing guidance for the improvement of team functioning. Using the full selection of features produced accuracy percentages around 70%, suggesting there is merit in attending to all the essential aspects. However, the four models detailed above give clear guidance for coaches and practitioners to target areas of particular importance. For example, the selection of the most appropriate team captain, devoting time to develop a clear understanding of task-related (e.g., roles, games, etc.) aspects, as well as directing effort towards building and maintaining levels of trust across the team would likely facilitate the development of an effective team.

Conclusion

The present research employed a number of innovative procedures by which to develop and subsequently measure the complex issue of effective team functioning in cricket. The findings suggest that certain features within the IETI can accurately predict an effective team in nearly 90% of instances. Consequently, the inventory is a scientifically robust tool that can be applied to the diagnosis of team problems, and the assessment of team functioning

in future research. The approach outlined in the manuscript represents a template by which interested researchers can collaborate with high level sports organisations to develop tools they value.

Chapter 4

Development of team functioning in sport: A case study of a theoretically-grounded team building intervention in cricket

Abstract

The application of team building activities to the development of teams is commonplace in sport. Despite research revealing a moderately positive, significant relationship between team building and performance (Martin, Carron, & Burke, 2009), it could be argued that these interventions have a predominant focus on developing cohesion, whilst overlooking the multitude of other variables that have been found to influence team effectiveness (e.g., Beauchamp, McEwan, & Waldhauser, 2017). Therefore, the present study designed, delivered, and evaluated a theoretically informed intervention based on the model of Essential Team Ingredients (Chapter 2). A case study approach was adopted, whereby an elite female cricket team completed the Inventory of Essential Team Ingredients (IETI; Chapter 3) before and after a 2-week intervention which included the development of a leadership group, individual one-page profiles on team members, structured debriefs, positive individual feedback, and team socials. All elements of the intervention were designed to address specific deficiencies identified from the pre-intervention IETI results. Post-intervention IETI results and focus group and interview narratives revealed that performance, and several of the aspects of the IETI targeted through the intervention had improved, yet ratings of overall team effectiveness remained unchanged. The results provide an indication that team functioning can be improved over a short period of time, and present preliminary evidence to support the utility of the IETI in team development practices.

Introduction

Psychological interventions that focus on the team are generally referred to under the rubric of ‘team building’ (Brawley & Paskevich, 1997), although the term team training is often used throughout the organisational psychology literature. Team building and team training are both designed to improve team functioning and effectiveness, yet differ in important ways (Tannenbaum, Beard, & Salas, 1992). Team training is focused on developing specific skills, conducted in context, and is generally formal and systematic. Team building, on the other hand, does not target skill-based competencies, is often conducted outside of the performance environment, and is not systematic in nature (Klein et al., 2009). We adopt the term team building to represent all team development interventions, as this terminology is most commonly utilised in the sport psychology literature.

The positive effects of team building interventions on team effectiveness is evident across a range of contexts; healthcare (e.g., Weaver, Dy, & Rosen, 2014), military (e.g., Smith-Jentsch, Cannon-Bowers, Tannenbaum, & Salas, 2008), aviation (e.g., Littlepage, Hein, Moffett, Craig, & Georgiou, 2016), and sport (e.g., Martin, Carron, & Burke, 2009). Research in organisational psychology suggests that interventions targeting components of teamwork result in improvements in a number of outcomes related to team effectiveness such as performance, teamwork processes, and cognitive outcomes (e.g., Hollenbck, De Rue, & Guzzo, 2004; Salas et al., 2008). A recent meta-analysis found positive and significant medium-to-large sized effects for team training interventions on teamwork and large effects on team performance (McEwan, Ruissen, Eys, Zumbo, & Beauchamp, 2017). Collectively, these findings suggest that team building targeting specific components has notable potential to contribute to the successful attainment of team objectives.

Until recently, research into the distinct components of teamwork in sport has been fragmented at best (Carron, Martin, & Loughead, 2012). In a valuable addition to the literature McEwan and Beauchamp (2014) conducted a theoretical review of team effectiveness and teamwork frameworks in organisational psychology to propose an integrated model of teamwork in sport. However, this model has yet to be utilised in the design or delivery of teambuilding interventions.

The research conducted in Chapter 2 adopted an alternative, “bottom-up” (inductive), approach to develop an evidence-based framework of team effectiveness in cricket². Whilst development of the Essential Team Ingredients (ETI) model drew on the extant organisational psychology literature, it was predominantly shaped by the experiences of professional cricketers. Notably, factors more prevalent in organisational than sport psychology research appeared to be most important for effective team functioning (e.g., *trust* and *shared understanding*). The emergent factors were situated within the broad themes of culture and environment, values, communication, understanding, and leadership.

The team building literature in sport is limited by a reliance upon a select number of intervention protocols (e.g., goal-setting, interpersonal relationships, adventure experiences, and task related variables; Kleinert et al., 2012) at the expense of developing specific teamwork competencies. This does not necessarily undermine the value of these protocols, however, as team building interventions in sport have been found to have a medium effect on performance (Hedges $g = .43$; Martin et al., 2009), suggesting that such interventions generally lead to salient group effectiveness outcomes. Interestingly, team building activities were found to have limited influence on the most frequently examined dependent variable of

² This is a published article: Webster, L. V., Hardy, J., & Hardy, L. (2017). Big Hitters: Important Factors Characterizing Team Effectiveness in Professional Cricket. *Frontiers in Psychology*, 8, 1140. DOI: <https://doi.org/10.3389/fpsyg.2017.01140>

cohesion; the extent to which a group is united in pursuit of its instrumental task-related and/or social activities (Carron, Widmeyer, & Brawley, 1985).

A recent citation analysis revealed that the construct of cohesion and work of Carron and colleagues (e.g., Carron, 1982; Carron et al., 1985) dominates the team building literature in sport (Bruner, Eys, Beauchamp, & Cote, 2013). This narrow focus and conceptualisation of team effectiveness as cohesion overlooks the multidimensional nature of team effectiveness that is widely accepted in organisational psychology (Salas, Shuffler, Thayer, Bedwell, & Lazzara, 2015). As Martin et al.'s (2009) findings intimate, there may be a host of other group-based mediators that serve to improve team functioning.

In light of the limitations evident in the team building literature in sport a recent review makes two important recommendations (Beauchamp, McEwan, & Waldhauser, 2017): first, that psychometrically sound assessment procedures are developed for use with sports teams. Although certain group-related variables have been subject to assessment (e.g., role clarity; Beauchamp, Bray, Eys, & Carron, 2002, and conflict; Paradis, Carron, & Martin, 2014b), there has been little recognition of the multidimensional nature of team effectiveness or associated need to assess the numerous components in concert. Second, Beauchamp et al. (2017) advocate for the development and evaluation of *teamwork* interventions in sport. The present study sought to respond to these recommendations through the application of the Inventory of Essential Team Ingredients (IETI; see Chapter 3) to the design, delivery, and subsequent evaluation of a teambuilding intervention in professional cricket.

The IETI is a single-item based inventory designed to measure the various sub-components of the ETI model (Chapter 2). The inventory; a scientifically robust assessment tool, was developed to be applied to the research, evaluation, and quality improvement of cricket teams. Chapter 3 validated and utilised the IETI to determine the factors most

pertinent to team effectiveness in cricket, generating the first empirical sports data confirming the assumed relationship that enhanced team functioning yields superior effectiveness. Specifically, certain features within the IETI accurately predicted an effective team in nearly 90% of instances. Elements of trust, understanding, and leadership – particularly from the team captain – were consistently associated with the most effective teams.

This improved understanding of the specific factors relevant for team effectiveness in cricket will help guide the development of more theoretically informed interventions. Indeed, Ohlert and Zepp (2016) propose the following methodology for the development of theory-based team interventions: a) practitioners should understand the factors with most theoretical and empirical relevance for team performance, b) valid instruments should be selected for team diagnostics, c) team diagnostics should be conducted to detect factors in need of improvement, d) based on the results of the diagnostic, the most appropriate methods to effect respective factors must be selected, e) an intervention should be conducted over several weeks, and f) the effects of such intervention should be evaluated. Given that the application of theoretical models of team effectiveness to the development of teams in sport is rare, the aim of the present research was to design and deliver a theory-based, bespoke team building intervention based on results from the IETI and evaluate the effects of the intervention.

Rather than adopt an experimental method which may be incompatible with the demands of a practice setting (Anderson, Mahoney, Miles, & Robinson, 2002), case studies provide an alternative to understanding the processes behind the application and effectiveness of an intervention (Voight, 2012). Therefore, the present research adopted a case study design to investigate the changes that occur following the coach-led delivery of a bespoke team-building intervention with a professional female cricket team.

Method

Team and Participants

In order to report the results of the research anonymously, a detailed description of the team is not possible. However, to provide some context to the research, the present sample was drawn from an elite domestic, female cricket league within the UK. Having never played together as a complete team previously, members came together for a period of five weeks to compete in the most prestigious, professional women's cricket competition in England and Wales. Throughout this period all fifteen members trained together.

Players were aged between 18 and 32 years ($M = 23.87$, $SD = 3.96$). Eight of the squad had received international caps (totalling 399 appearances, across a span of 10 years), thus were considered senior players. Five had not played in the tournament previously, thus regarded as junior players, and two were non-international, but had played in the tournament previously. Of the 15-player squad, eight had played for the team in the previous season.

The staff consisted of a team manager, head coach, two assistant coaches, a performance analyst, a strength and conditioning coach, a physiotherapist, and psychologist (3 males and 5 females). Staff ranged in age from 20 to 40 years ($M = 29.00$, $SD = 6.38$), and all had a wealth of experience in cricket, both as players and coaching/support staff.

Data Collection

Inventory of Essential Team Ingredients (IETI). Developed from in-depth interviews with international male and female cricket players, coaches, and psychologists, the IETI is a 31-item inventory designed to assess the overall functioning of a cricket team (see Chapter 3 for a detailed description).

Team effectiveness. Performance statistics alone are unable to fully capture a team's ability to work together as a collective. Moreover, it can be argued that an assessment of *how* a team interacts to achieve its desired outcome is of greater value than merely the outcome alone (Salas, Sims, & Burke, 2005). To capture a more complete picture of team effectiveness, we collected three different outcome measures. Previous research utilising the IETI captured a more holistic perspective of team effectiveness by assessing *self-rated team effectiveness efficacy* (the team's perception of their own ability to work together to produce results), *self-rated teamwork* (the team's perception of whether the team was greater than the sum of the individual players), alongside *performance* (i.e., points accrued across a season), and *informant-rated* measures of effectiveness and teamwork. The present study assessed team effectiveness via the two self-rated team effectiveness efficacy items and one self-rated teamwork item (see Chapter 3 for a detailed description of these items).

In contrast to Chapter 3, both IETI and team effectiveness data were collected through small group ($n = 5$) interviews rather than individual self-report. Participants were collectively asked each item in turn, encouraged to share their thoughts on the item and reach a consensus on a score based on the relevant Likert scale. During the post-intervention interviews participants were asked to discuss how qualities had changed through the course of the intervention. There were a number of reasons for this focus group style approach. First, the aggregation of individual level data to represent group constructs is subject to a number of challenges (van Mierlo, Vermunt, & Rutte, 2009). It has, therefore, been proposed that a group interview can be conducted in such a way that, through group discussion in response to questions, the group arrives at a consensually established rating (Gist, 1987; Guzzo, Yost, Campbell, & Shea, 1993). Furthermore, within the collective efficacy literature discussion methods have been found to provide more robust group-level data than aggregation methods (Gibson, Randel, & Earley, 2000). Second, it was anticipated that the group discussion would

provide some context for the results that may assist in the design of the intervention. Third, previous research has successfully utilised open discussion of team functioning as a team building technique (Pain & Harwood, 2004). Therefore, we believed that an honest dialogue about the team's level of functioning would provide a firm foundation from which to build a successful intervention.

Participant diary. Throughout the course of the intervention participant diaries were used to document experiences and observations and provide reflections on the ongoing impact of the intervention. This approach has been adopted in other research investigating organisational functioning (e.g., Wagstaff, Hanton, & Fletcher, 2013). The head coach, captain, and a junior player were invited to record a brief audio diary on a regular basis throughout the season, and were prompted to consider questions such as: "What impact did any team-related activities have on the team dynamic?" and "What challenges were there to the team coming together?" The junior player was selected on the basis of observations made by the first author, and discussions with the head coach which suggested that the player got on with all team members. A more balanced view was therefore obtained, providing an alternative to the management centric perspective that was otherwise obtained. These data sources were subsequently transcribed verbatim and written-up into coherent stories.

Social validation. Page and Thelwell (2013) advise that the use of social validation, a tool to determine the satisfaction with an intervention, is important in intervention studies. Although methods of social validation vary, common recommendations include the use of all-encompassing questions such as: how important the user perceived the task to be, what they thought of the procedures of the intervention, and whether they were satisfied with the results. As a result, follow-up semi-structured interviews were conducted with the head coach, a senior international player, and the junior player who completed the participant diary. These interviews allowed better insight into the 'real-world' value of the intervention and how it was

perceived by participants. As the intervention was delivered by the head coach; prescribed, but not directly overseen, by the research team, the interviews also served to provide further detail on how the intervention was delivered.

Procedure

Phase 1: Pre-season. It was agreed with the head coach that to gain the greatest buy-in by players and ensure the success of the intervention the present author would work as the team psychologist, providing individual psychological support to players throughout the season, in addition to collecting data and facilitating the team-building intervention. After obtaining institutional ethical approval the head coach introduced the first author and explained the remit of her role to staff and current team members (the international players had yet to join the team) early in the team's pre-season. Participants were provided with verbal and written information about the background to the research, the study rationale, methods, and potential uses of data. All participants present agreed to participate and provided full written informed consent.

During this phase, before the arrival of the international players, the author spent a number of days with the squad familiarising herself with the environment and building relationships with both staff and players. Participants received brief education on the model of ETI; introducing and defining each component in turn, before offering a holistic view of how the components related to one another. This approach was adopted from previous research utilising the IETI (Chapter 3). Furthermore, pre-season IETI data was collected via two group interviews. The purpose of this data collection was to provide contextual insight about the team which might be useful for designing the intervention.

The senior, international players joined the team nine days before the first game of the competitive season. The first author was again introduced to these players by the head coach,

provided them with brief education on the model of ETI, and collected written informed consent. It was inappropriate to collect pre-intervention data at this juncture however, as the complete (in-tact) team did not have any collective playing or training experiences from which to draw on to accurately respond to the items on the IETI.

Phase 2: Competitive season. The team's competitive season lasted for a period of three weeks. The pre-intervention IETI and effectiveness data were collected a week after the arrival of the international players, and two days before the team's first competitive game. The group interviews were structured such that there was an equal representation of senior and junior players across the three groups. A fourth group was formed by the staff, and the team captain then completed the inventory independently. The reason for this separation of captain and staff was that Guzzo et al. (1993) argue that the presence of organisational superiors makes the group interview approach unsuitable due to an increase in politically correct responses. The results from this phase of the research were used to design an intervention tailored to the specific requirements of the team.

The qualities that the team were lower on, and thus would be targeted in the intervention, appeared to relate to either communication (*safe to speak*, $M = 3.8$, $SD = 1.1$; *feedback*, $M = 4$, $SD = 1.22$; *challenge*, $M = 4.2$, $SD = .84$) or understanding (*understanding of team members' games*, $M = 4.4$, $SD = 1.34$; *understanding of personalities*, $M = 4.4$, $SD = .55$). To address some of the lower ratings of the captain on the IETI it was considered important for her to lead on elements of the intervention (i.e., the understanding of team members' personalities) to increase the visibility of certain leadership behaviours.

Intervention. Meta-analytic evidence indicates that both direct (delivered by a sport psychologist) and indirect (psychologist works with coach who in turn implements the program) team-building interventions are equally effective (Martin et al., 2009). Voight and Callaghan (2001) reason that coaches may be more effective than outside consultants in

facilitating a team building program due to the greater reciprocal investment between them and the players. Indeed, the high level of trust in the head coach evident in the IETI results suggest that a coach delivered intervention would be well received by the players. Therefore, in collaboration with the first author, the head coach integrated the following activities designed to improve specific aspects of team functioning and delivered them during the team's three-week competitive season. Due to the timing of the team's competitive matches the intervention was unable to commence until after the second game.

Whilst it was important to deliver a bespoke intervention which addressed the specific requirements of the studied team, the findings from Chapter 3 needed to also be considered in the design of the intervention. It was not deemed appropriate to solely rely on the findings from a single criterion variable (i.e., *team performance*, *self-rated effectiveness efficacy*, *self-rated teamwork*, or *informant-rated team effectiveness*), instead we attended to the elements of team functioning that were consistently found across various criterion models. Thus, it was apparent that *trust in competence and intention*, *understanding of roles and games*, and *captain inspiration* (found in at least three of the classification models in Chapter 3) all warrant particular attention in an intervention designed to improve overall team effectiveness. Specifics of the intervention are detailed in Table 4.1 and a timeline included in Appendix H.

Phase 3: Post- season. Post-intervention data were collected four days after the team's final match of the tournament. As previously, IETI and team effectiveness data were collected via three group interviews with players, one staff group interview, and then independent completion of the items by the captain. The composition of the groups remained largely unchanged from pre-intervention. At this time two semi-structured interviews were also conducted with the head coach and one of the overseas international players to gather initial observations and reflections on the team's development (see Appendix I for details of the interview questions).

Table 4.1. Summary of team-building intervention

Aspect of Intervention	Target of Intervention	Summary of Activity
1. Leadership group	Trust in captain, captain understanding, captain lead by example, togetherness	There was a marked difference in the perceived quality of leadership provided by the team captain as opposed to the head coach. The qualitative group interview data suggested that the captain was a somewhat reluctant leader: <i>“she’s said that she doesn’t strive to be a captain, that’s not her ambition, and it is she’s kind of fell on it really”</i> (Pre-intervention, Staff). Therefore, one early objective of the intervention was to form a leadership group consisting of the captain, vice-captain, one senior and one junior player. The purpose of this group was to encourage more athlete leadership by these individuals proactively spending time with team members, crossing boundaries with the different social groups. It was also important for the leadership group members to role model the behaviours ascribed to in the team vision and values. A growing body of literature attests to the importance of athlete leadership, particularly that which comes from individuals other than the appointed captain (e.g., Fransen, Vanbeselaere, De Cuyper, Vande Broek, & Boen, 2014).
2. One-page individual profiles	Trust in captain, captain understanding, understanding personalities, understanding games	As a means by which to improve understanding of both individual’s personalities and their cricket games, the leadership group were tasked with completing a one-page profile on each member of the team. Each profile detailed indicators of the individual at their best and at their worst, what might derail them, and what they need from others. This information was acquired through an in-depth conversation between a member of the leadership group and the individual team member. The leadership group were encouraged to seek out team members that they may currently have limited understanding of. To share this information across the team all the <i>‘what helps me be at my best’</i> , and <i>‘derailers’</i> were collated into two large posters. The head coach then utilised these statements to facilitate a group discussion around how to collectively minimise <i>‘derailers’</i> and maximise the <i>‘me at my best’</i> .

3. Post-match debriefs Safe to speak, challenge, feedback

The intervention commenced following the loss of the first two games of the season. Therefore, there was a need to speak openly about team performances and make amendments to the game plan. Research has found that feedback influences a range of group processes such as collaboration and team cohesion, as well as performance (Gabelica, Van den Bossche, De Maeyer, Sagers, & Gijssels, 2014). The most effective debriefs follow a process of objective evaluation of past performance (reasons for success/failure), an inventory of alternative ways to approach the task, and a specific plan on how to handle future tasks differently (Gabelica et al., 2014). Therefore, a similar approach was adopted in debriefing the remaining matches of the season, with a particular emphasis on ensuring that team members had the opportunity to reflect on and discuss, in small groups, the objective assessment of errors before coming together to agree on how to correct them.

4. Positive individual feedback Trust in competence, togetherness

Qualitative data from the group interviews suggested that there was, or had been previously, somewhat of a divide between the international and domestic players, *“It felt quite separated. It was the overseas and the England girls who have obviously played together and they all know each other...and then the newer, younger group”* (Pre-season, Group 1). This divide was due, in part, to the higher status afforded to the international players, *“I think it can be quite difficult sometimes when a group has been training for so long and...then people come in that are perceived to be ahead [international players]...from a different scale”* (Pre-season, Group 2). Therefore, to ensure all players felt like they added equal value to the group, regardless of playing experience, individuals were asked to write one sentence about every player on the team: “why I am glad this person is in the team”. Each player then received a collection of fourteen statements that reflected their value to the team. The head coach chose to deliver this aspect of the intervention following the first two losses of the tournament. She felt the team was in need of confidence boost at this stage.

- | | | |
|----------------------|---|--|
| 5. Team social event | Understanding personalities, togetherness | The leadership group was tasked with arranging a social event designed to encourage interaction between team members outside of a cricket context. Benson and colleagues discuss the importance of group wide social activities, or social inclusionary tactics, to assimilate newcomers, develop interpersonal relationships, and promote group involvement (Benson, Evans, & Eys, 2016). The team had fewer matches in the second week of the tournament, so used this opportunity to host a cooking competition, where small groups of team members had to bake an item to be judged by the rest of the group. In an attempt to break down the divide between the international and non-international players, this activity was designed to be a ‘leveller’, whereby all team members had similar levels of skill to contribute to the group effort. |
|----------------------|---|--|

In order to gain familiarity with the data IETI results were graphically represented, and interview transcripts were read a number of times. Follow-up interviews were subsequently conducted with the head coach and junior player approximately two months after the end of the season to provide social validation of the research and evaluate each element of the intervention in greater detail.

Data Analysis

Through the course of the season six participant reflections were completed (four by the head coach, two by the junior player, with none forthcoming from the captain). Three interviews were conducted (lasting between 22 and 51 minutes, $M = 39.58$, $SD = 15.31$), one at the end of the tournament (head coach), and two a month later (head coach and junior player). Ten group interview/IETI completion sessions were conducted, two pre-season, four pre-intervention, and four post-intervention (lasting between 14 and 45 minutes, $M = 26.44$, $SD = 10.51$). All reflections and interviews were audio recorded and transcribed verbatim, yielding over six hours of recording and 145 transcript pages (56,259 words).

Quantitative analysis. A common method of analysis in single-case design research is visual inspection; examining the graphed data to reach a judgement about the reliability or consistency of intervention effects (Kazdin, 1982). Visual inspection of the present data proceeded in a number of stages. First, pre- and post-intervention data were graphed, and descriptive statistics calculated. Second, group scores were inspected to establish whether ratings had changed from pre- to post-intervention. This inspection was carried on the IETI and effectiveness data for the three interview discussion groups, the captain, and the staff group. Third, between group differences were inspected for pre- and post-intervention separately to determine the extent of agreement between groups. Finally, mean pre- and post-intervention scores were visually inspected - with a specific focus on those constructs targeted through the intervention - to assess whether the intervention had the desired overall effect.

Qualitative analysis. Initial analysis of the qualitative data involved listening to the recordings and reading each transcript a number of times to promote high familiarity with the data, before compiling a short summary of developing concepts for each transcript. As the aim of the research was to improve specific aspects of team functioning based on an existing model of team effectiveness (ETI; Chapter 2), data were largely analysed deductively. Drawing upon thematic analysis guidelines (Braun & Clarke, 2006), initial codes relating to the various elements of the IETI were identified across the entire data set. Codes were then sorted into themes by following each group across both time points to derive themes that represented the development of qualities over the course of the intervention. Subsequently, themes were explored across groups but within each time point to develop a detailed understanding of any differences between groups (e.g., coach vs. player differences). All themes were then reviewed, refined and collated into a story that most accurately captured the ‘essence’ of each theme (Sparkes & Smith, 2014).

Trustworthiness of data. The philosophical paradigm underpinning most case study research is that of constructionism (Baxter & Jack, 2008), whereby truth is relative and based on each individual’s social construction of reality (Searle, 1995). Within this paradigm, close collaboration between researcher and participant enables the participants to tell their story.

Adopting a relativist, rather than criteriologist position (see Smith & McGannon, 2017), we sought to ensure trustworthiness of the data through a number of strategies. The supervisory team served as critical friends throughout the analysis to listen and critique interpretations of the data and encourage reflexivity. Member reflections on the analytical interpretation was also sought from the head coach, not as a means of verifying the ‘truth’ of the findings, but to promote a discussion about the believability and appropriateness of the research (Smith & McGannon, 2017). Finally, to minimise researcher bias in the interpretation of the data, a confirmability audit was kept to ensure that data could be traced to its source, and the logic used to assemble the interpretation was explicit (Guba & Lincoln, 1989).

Results

The findings from all data sources are presented across four sections. The first section details the quantitative results from the IETI and team effectiveness data collected pre-intervention, before the start of the competitive season. The second section provides a brief biography of the team's season on a match by match basis. The third section presents the quantitative results from the IETI and team effectiveness data collected at the end of the tournament, and the final section utilises a combination of the quantitative data alongside the qualitative narratives obtained from the focus groups and interviews to consider how team functioning and effectiveness progressed through the course of the intervention.

Pre-intervention results

Figure 4.1 reveals a largely similar profile for elements of the IETI across respondents, with a correspondingly positive and negative views on most items (i.e., coach-captain relationship as unanimously strong, and the level of negative communication was universally low). However, some discrepancies are evident for ratings on the team's vision and values, safe to speak, constructive conflict, and feedback; whereby the staff consistently rated these items far more conservatively than the players, whereas the captain appeared to be more liberal with some of her ratings.

To design the intervention, the present results were interpreted in the context of findings from Chapter 3, where application of the ETI model to a sample of professional cricket teams revealed that certain features within the model contributed strongly to the accurate prediction of effective cricket teams. The predictive features varied somewhat based on the outcome of interest (i.e., team performance, team effectiveness efficacy, or teamwork) but consistently included elements of trust, understanding, and captain leadership.

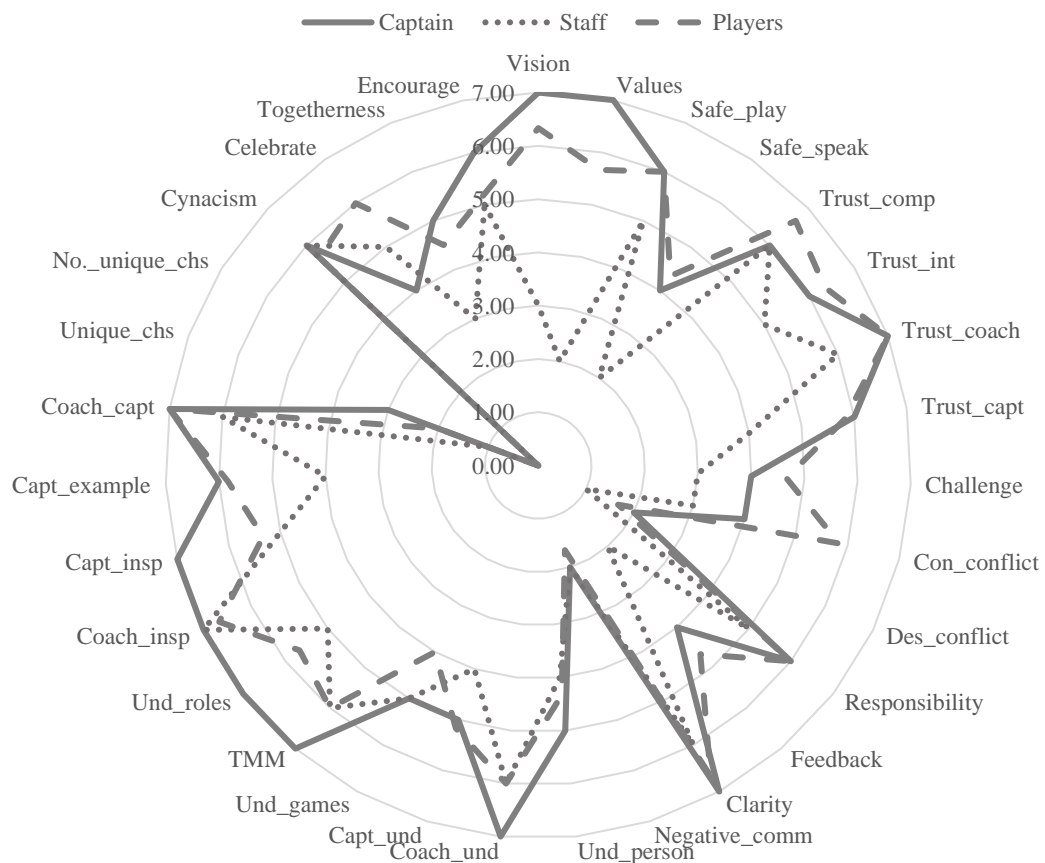


Figure 4.1. Pre-intervention IETI data

Compared to the findings from Chapter 3, the present team appeared to have a largely effective profile of team functioning. However, there were certain features that were rated lower than most effective teams in Chapter 3. In relation to high performing teams, the present team had lower ratings for *captain understanding* and *captain inspiration*. They also had lower ratings for *understanding games* and *captain inspiration* than teams who believed in their ability to work well together and respond to challenging circumstances (team effectiveness efficacy). Finally, compared with teams with high levels of teamwork, the present team revealed lower levels of *trust in captain* and *understanding roles*.

The present team, and the nature in which they came together quickly to perform in a short competitive season, represents a different sample to that studied in Chapter 3. Whilst drawing on the results from Chapter 3 to inform the intervention, it was also important,

therefore, to attend to the qualities that may not have been strong predictors of effectiveness in Chapter 3 but received low “current” ratings. Therefore, the areas upon which the intervention was focused were communication (*honest challenge, safe to speak, and feedback*), understanding (*understanding roles, games, and personalities*), and leadership (*captain understanding and inspiration, trust in captain, and lead by example*).

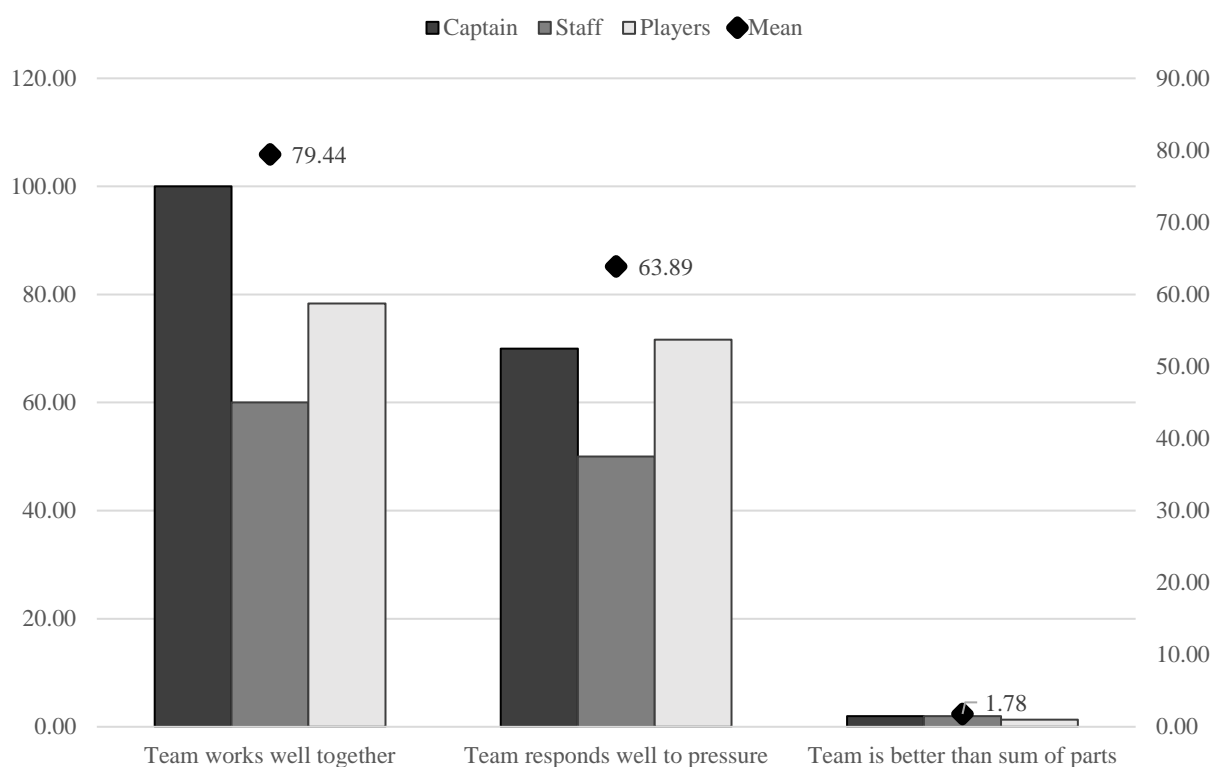


Figure 4.2. Pre-intervention effectiveness data

Figure 4.2 suggests that pre-intervention the team was fairly confident in their ability to work together as a collective and respond to challenging circumstances and felt they would perform somewhat better than the sum of their parts. The conservative rating of the staff is particularly noteworthy however, as is the discrepancy between staff and captain.

Match performances

Game 1, July 12th. Away from home, the team lost their first game. The team lost nine wickets; two of these were run-outs (clear examples of a lack of co-ordinated play). No

individual batter scored over 25 runs, and no partnership produced more than 30. Although the team took five wickets (one run out, three catches, and one bowled), the opposition chased down the score set within the allotted overs.

Game 2, July 15th. The team faced the tournament holders and 2017 title favourites. Despite batting out their 20 overs, the team fell short of the total set. Fielding first, the team only took two wickets; one catch and one run out. They then lost all 10 wickets in pursuit of the total; three of which were run-outs. Again, the highest scoring individual and partnership did not surpass 30 runs.

Game 3, July 18th. Two days after the onset of the intervention, in the first home game, the team suffered a much closer defeat. Fielding first, the team took five opposition wickets (one catch, one run-out, and three bowled). Despite the captain high scoring with over 40 runs and contributing to a high scoring partnership of a half century, the team lost five wickets (none of which were run-outs) and failed to score quickly enough to chase down the runs required.

Game 4, July 20th. In the penultimate game of the tournament, away from home, the team won by a large margin, bowling the opposition out within the allotted overs. Batting first, the team lost only five wickets and produced their best batting performance to date; no run-outs, and highest individual score nearing 80 runs. In the field, the team took all 10 wickets, conceding very few runs (three catches, one stumping, four LBWs, and one bowled).

Game 5, July 26th. The final pool game of the tournament followed a long rest period and was away against the toughest opposition. In their best performance the team won by a large margin having set their highest batting total, losing only three wickets (again no run-outs). Both individual and partnership high scores were the greatest yet, each nearing 100 runs. The team took all 10 wickets (four catches, one LBW, and five bowled) within the allotted overs. Despite a strong finish, the team ended the tournament mid-table.

Post-intervention results

Figure 4.3, although similar in profile to pre-intervention, reveals slightly higher ratings, whereby most items had moderately improved. Less discrepancy between respondents is evident, suggesting firmer collective understanding of the team's functioning.

The post-intervention data in Figure 4.4 does not reveal much improvement in the team's overall effectiveness through the course of the intervention. Although the rating for how well the team worked together as a collective was the same as pre-intervention, the captain tempered her initial, liberal rating, and staff increased their originally lower ratings to be in agreement post-intervention. However, as evident pre-intervention, the staff were far more prudent in their rating of how well the team responded to pressure, lowering the mean significantly. Respondents were generally in agreement, however, that overall the team had performed worse than expected given the level of talent available.

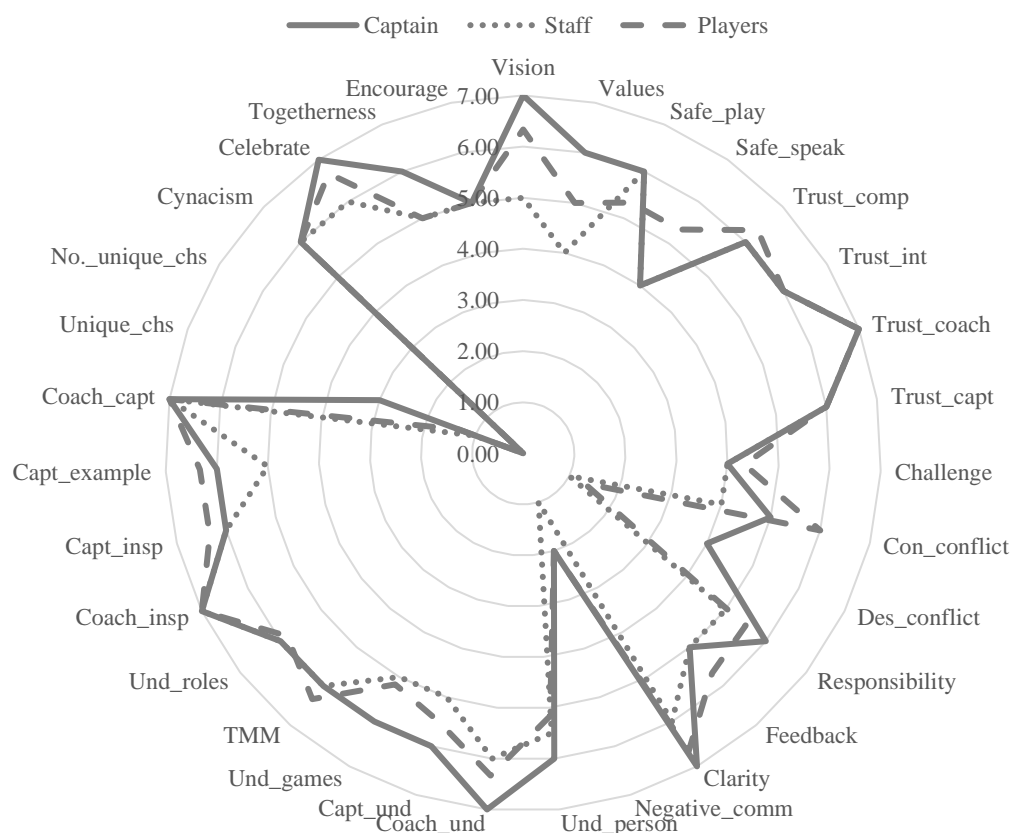


Figure 4.3. Post-intervention IETI data

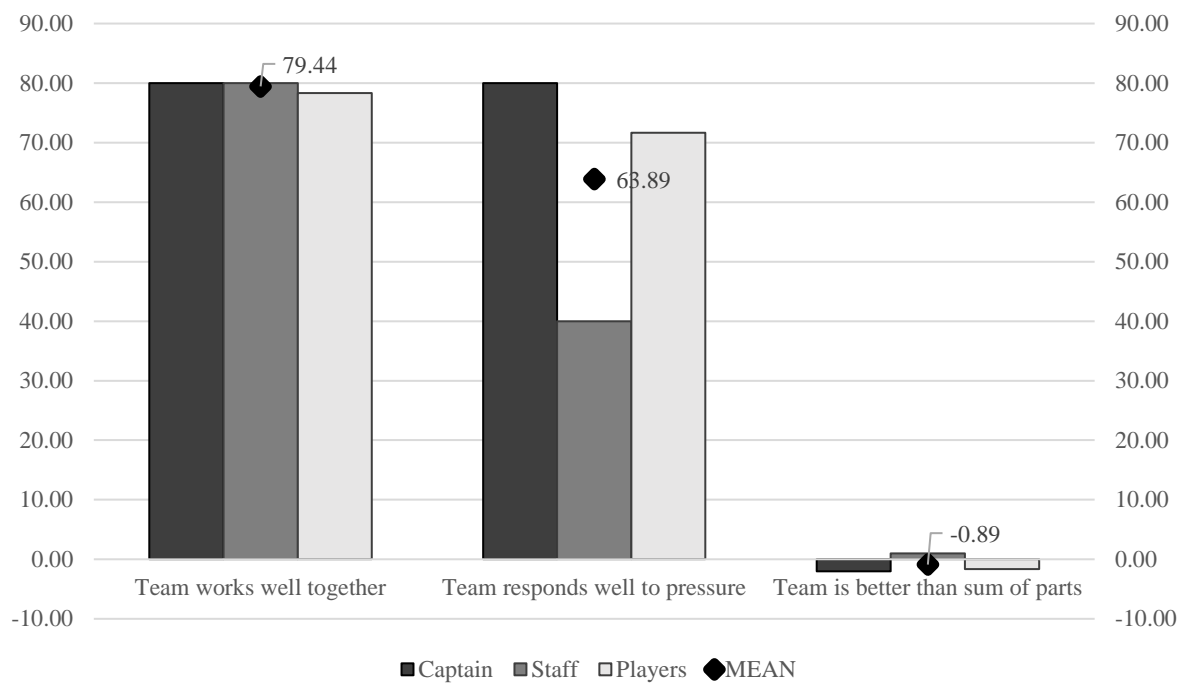


Figure 4.4. Post-intervention effectiveness data

Table 4.2 and Figure 4.5 display the mean ratings for all items of the IETI pre- and post-intervention, revealing improvements in certain aspects. Of particular note is the increase in both *safe to speak* and *feedback*, and in all items relating to the captain. The extent to which the team *celebrated success* and came *together* as a group also appeared to improve through the season.

Table 4.2. Pre- and post-intervention means and standard deviations of IETI data

Aspect of team functioning	Time 1					Time 2				
	Mean	SD	Players	Capt.	Staff	Mean	SD	Players	Capt.	Staff
1. Vision	5.80	1.79	3.00	7.00	3.00	6.20	0.84	6.33	7.00	5.00
2. Values	5.20	1.92	2.00	7.00	2.00	5.00	1.00	5.00	6.00	4.00
3. Safe to play	5.80	0.45	5.00	6.00	5.00	5.60	0.89	5.33	6.00	6.00
4. Safe to speak	3.80	1.10	2.00	4.00	2.00	4.80	0.84	5.33	4.00	4.00
5. Trust competence	6.40	0.55	6.00	6.00	6.00	6.20	0.45	6.33	6.00	6.00
6. Trust intention	6.00	0.71	5.00	6.00	5.00	6.00	0.00	6.00	6.00	6.00
7. Trust coach	6.80	0.45	6.00	7.00	6.00	7.00	0.00	7.00	7.00	7.00
8. Trust captain	5.50	0.87	4.00	6.00	4.00	6.00	0.00	6.00	6.00	6.00
9. Challenge	4.20	0.84	3.00	4.00	3.00	4.20	0.45	4.33	4.00	4.00
10. Constructive conflict	4.90	1.34	3.00	4.00	3.00	5.40	1.14	6.00	5.00	4.00
11. Destructive conflict	1.60	0.55	1.00	2.00	1.00	1.80	1.30	1.33	4.00	1.00
12. Responsibility	5.80	0.45	5.00	6.00	5.00	5.50	0.50	5.50	6.00	5.00
13. Communication feedback	4.00	1.22	2.00	4.00	2.00	5.40	0.55	5.67	5.00	5.00
14. Communication clarity	6.60	0.55	6.00	7.00	6.00	6.60	0.55	6.67	7.00	6.00
15. Destructive comm.	1.80	0.45	2.00	2.00	2.00	1.80	0.45	2.00	2.00	1.00
16. Understanding personality	4.40	0.55	4.00	5.00	4.00	5.40	0.82	5.17	6.00	5.50
17. Coach understanding	6.20	0.45	6.00	7.00	6.00	6.40	0.55	6.33	7.00	6.00
18. Captain understanding	4.90	0.74	4.00	5.00	4.00	5.50	0.50	5.50	6.00	5.00
19. Understanding games	4.40	1.34	5.00	5.00	5.00	5.30	0.45	5.17	6.00	5.00
20. Team mental models	6.20	0.45	6.00	7.00	6.00	6.20	0.45	6.33	6.00	6.00
21. Understanding roles	5.80	1.10	5.00	7.00	5.00	5.90	0.22	5.83	6.00	6.00
22. Coach inspiration	6.80	0.45	7.00	7.00	7.00	7.00	0.00	7.00	7.00	7.00
23. Captain inspiration	5.60	0.89	5.00	7.00	5.00	6.20	0.45	6.33	6.00	6.00
24. Lead by example	5.50	0.87	4.00	6.00	4.00	6.00	0.71	6.33	6.00	5.00
25. Coach-captain relationship	6.80	0.45	6.00	7.00	6.00	7.00	0.00	7.00	7.00	7.00
26. Unique characters	2.00	1.41	1.00	3.00	1.00	1.60	0.89	1.33	3.00	1.00
27. Number unique characters	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

28. Lack of cynicism	5.80	0.45	6.00	6.00	6.00	6.00	0.71	6.00	6.00	6.00
29. Celebration of success	5.40	0.89	5.00	4.00	5.00	6.60	0.55	6.67	7.00	6.00
30. Togetherness	4.30	0.84	3.00	5.00	3.00	5.20	0.84	5.00	6.00	5.00
31. Encouragement	5.30	0.67	5.00	6.00	5.00	5.00	0.00	5.00	5.00	5.00

Effectiveness items	Mean	SD	Players	Capt.	Staff	Mean	SD	Players	Capt.	Staff
1. Team works well together	79.0	14.75	78.33	100.00	60.00	79.0	5.48	78.33	80.00	80.00
2. Team responds to challenge	67.0	13.04	71.67	70.00	50.00	67.0	17.89	71.67	80.00	40.00
3. Teamwork	1.60	0.42	1.33	2.00	2.00	-1.20	1.64	-1.67	-2.00	1.00

* The M and SD reported are those calculated across the five separate groups assessed

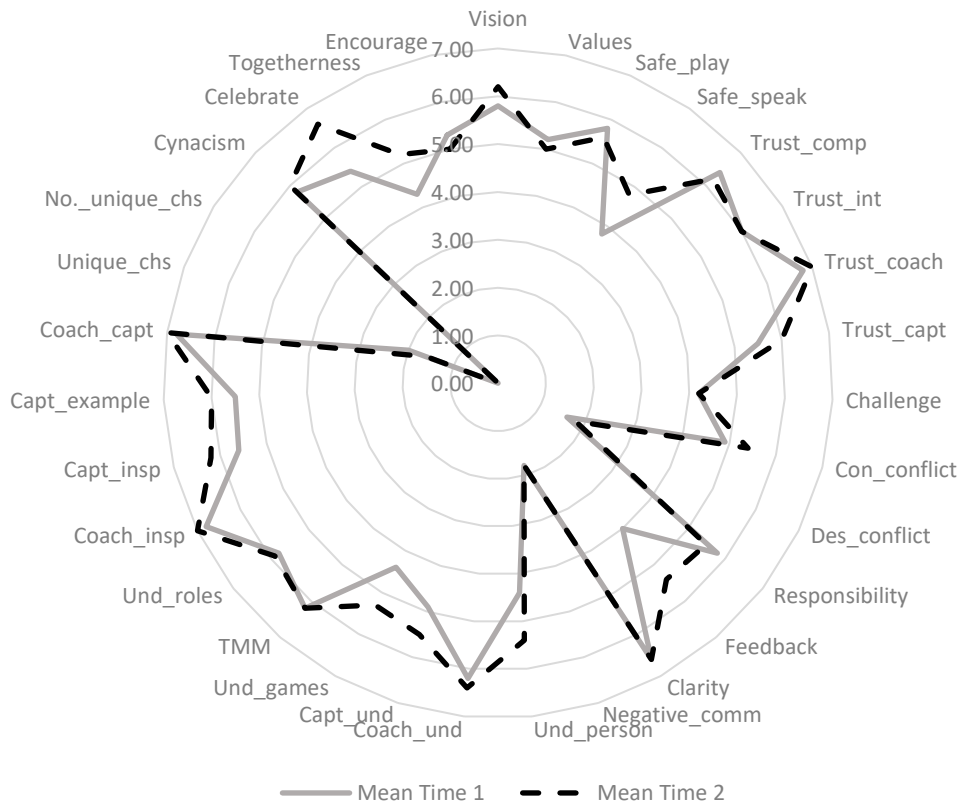


Figure 4.5. Pre- and post-intervention IETI data

As many of the team met for the first time only a week before the pre-intervention data were collected, it was expected that many of the features of the ETI would improve somewhat organically through the course of the season. For example, the understanding of team members' personalities naturally increases as team members spend more time together on and off the cricket field. However, given the short time frame in which the intervention was delivered (two weeks), it would have been surprising to see highly elevated scores post-intervention, particularly as previous research has suggested that teambuilding interventions lasting less than two weeks result in non-significant effects (Martin et al., 2009).

Counter to the meta-analytic findings above however, the present research found positive improvements in several areas. Whilst no improvements were evident in overall, self-rated team effectiveness, this was perhaps to be expected given the nature of the team's performances throughout the tournament (i.e., they failed to deliver high levels of

performance in all matches). However, all features targeted through the intervention, with the exception of *honest challenge* (pre- $M = 4.20$, $SD = .84$, post- $M = 4.20$, $SD = .45$), received higher ratings post-intervention. Elements of communication increased by one or more Likert point (*safe to speak* pre- $M = 3.80$, $SD = 1.10$, post- $M = 4.80$, $SD = .84$; *feedback* pre- $M = 4.00$, $SD = 1.22$, post- $M = 5.40$, $SD = .55$), representing a percentage increase of 26.32% and 35%, respectively. With the exception of understanding of roles (pre- $M = 5.80$, $SD = 1.10$, post- $M = 5.90$, $SD = .22$), the elements of understanding increased by around 20% (*understanding games* pre- $M = 4.40$, $SD = 1.34$, post- $M = 5.30$, $SD = .45$; *understanding personalities* pre- $M = 4.40$, $SD = .55$, post- $M = 5.40$, $SD = .82$). Additionally, ratings of the captain's leadership improved by approximately 10% over the course of the intervention (*trust in captain* pre- $M = 5.50$, $SD = .87$, post- $M = 6.00$, $SD = .00$; *captain understanding* pre- $M = 4.90$, $SD = .74$, post- $M = 5.50$, $SD = .50$; *captain inspiration* pre- $M = 5.60$, $SD = .89$, post- $M = 6.20$, $SD = .45$; *lead by example* pre- $M = 5.50$, $SD = .87$, post- $M = 6.00$, $SD = .71$).

Integration of quantitative and qualitative findings

Rather than referring to each item of the IETI in turn, the results are presented in themes that represent the most pertinent elements of the ETI model for this particular team. The themes also largely reflect the focus of the intervention. Within each theme we discuss how certain elements progressed through the course of the intervention and refer to any differences between focus groups where appropriate.

Culture. Figure 4.1 reveals largely discrepant ratings between the staff and players for items relating to the team's vision and values. Although the staff consistently rated items more conservatively, reasoning for this particular discrepancy emerged in the focus group narratives. That is, staff were unclear as to whether the vision and values were understood or shared across the team; particularly the vision, as this was devised by the head coach,

There is a long-term vision, but the thing is, is it shared? Because it's very much been devised by me...and that's what I base everything on. If you asked [players]...what role does [the team] play in your development..., I would say they're into 'inspiring, motivating, developing the next generation of world class players' but [the players] would not say that statement (pre-intervention, head coach).

However, it was apparent that the head coach had worked hard to align everything to the team's vision, "even stuff like the launch night, that is all part of that vision, designed to meet that vision" (pre-intervention, head coach). This had been recognised by the players, "I feel like [the vision is] strong just because of that stuff the other night [launch night], and talking about the aspirational goals of developing people... that's why I would say strongly agree, for someone who's never been a part of it" (pre-intervention, group 3). There was clearly a purpose that extended beyond winning the major tournament of the year, and this could be articulated by both staff and players alike.

In terms of having a set of values that guided the day to day behaviour of team members, staff and players were again more aligned in their thinking than the IETI data suggested. Despite no formal process of establishing the values, staff and players felt there was an implicit way of behaving in the environment that everyone adhered to, "you've got an environment where the day to day behaviours are generally quite good. How they know what the line is, I can't quite articulate that" (pre-intervention, assistant coach). Equally, one of the overseas players shared, "it seems obvious to me what you guys are about from the first time I met you...it's not an agreed set of values that I don't think you guys have sat down and developed but I would say that you have strong values" (pre-intervention, group 3). For the players, both vision and values were given consistently high ratings at the start and end of the intervention period. In contrast, over the course of the tournament, the staff came to understand that the vision and values were shared to a greater extent than they believed pre-

intervention, “I think it’s quite evident that people are [clear on] what we’re here for and where we’re going” (post-intervention, head coach).

Communication. One focus of the intervention was on developing player confidence to speak openly and honestly, provide feedback, and challenge unacceptable behaviour, as these were some of the lowest rated items pre-intervention (see Figure 4.1 and Table 4.2). Participants initially felt that “[not] everybody would feel comfortable saying stuff in front of the group” (pre-intervention, group 1), potentially due to “a fear of failure...from a social point of view... Some players will have that insecurity” (pre-intervention, assistant coach). Players believed they would have to feel confident in their knowledge, experience, or place in the team to feel comfortable challenging another member, “you’d have to be pretty confident before disagreeing” (pre-intervention, group 3). In particular, it was thought that younger players would be far less likely to speak up in front of the group, “I think that some members would, but might not. Especially as some people are younger, they might be uncomfortable challenging an older member” (pre-intervention, group 1). “I was the youngest in the team, for example, last year, so would people respect me and my knowledge because I didn’t play, I was the youngest?” (pre-intervention, group 3).

The reluctance to challenge or provide feedback to players was not solely a result of age however, as there appeared to be a hierarchy present in the team that prevented lower status members feeling comfortable enough to speak,

[The head coach] wants everyone to stand up in the meeting, she was like to me ‘you have your ideas but you don’t share them in a meeting, why?’ and I was like ‘because people like [the captain] and players like that are on such a pedestal that I’m never going to go and stand up in a meeting and slag someone off (junior player interview).

The staff had an aspiration for high levels of challenge and feedback that was maybe not shared by the players. One of the junior players relayed a conversation she had with the head coach who said,

‘You know in the boys’ environment they are all brutally honest...and a player will stand up and challenge other players.’ She was like, ‘I want this in women’s cricket’. I was like ‘you’re never going to get that in women’s cricket because everyone takes it so personally’ (junior player interview).

This may, in part, explain the discrepant ratings between staff and players for the communication-related items. The staff were rating the team based on current behaviours compared to the high levels of challenge/feedback they were striving for, whereas the players were more pragmatic about what was realistic in the environment. For those who played international level cricket the staff expected that open and honest communication would be more evident, and player-led feedback accepted because all players perform to a similar standard, “playing at an [international] level where if you criticise someone or give them feedback for not doing something the right way it’s completely taken on board, then understood and everyone knows it’s nothing personal” (pre-intervention, assistant coach). Whereas this was not necessarily true of the present team, as there was a perceived gap between the international and domestic players,

I just think that when you come into this environment, it’s a big stage... whether they [domestic players] think they’re out of their depth or whether they think it’s out of place, I’m not quite sure. That probably doesn’t help anything if they think someone’s better than them in this environment (pre-intervention, assistant coach).

In an interview with the head coach at the end of the season she reflected on the role she may have played in reinforcing the disparity between domestic and international players by expecting a lot from the international players,

I think I over-estimated a little bit what the overseas can bring, while I just keep forgetting they're just humans themselves and they make mistakes. They do need more support rather than just relying on them a little bit too much (Head coach interview).

Indeed, one of the overseas players observed that at the start of the season the team were waiting for someone to lead, i.e., waiting for the arrival of the international players, “at the beginning I think they [the team] were timid and looking for others to lead/ do the job” (Overseas player interview). This hierarchy was perhaps reinforced, inadvertently, by both players and staff, and led to a reluctance to speak openly and honestly.

Another reason proffered for not challenging or feeding back to team members was the lack of knowledge and understanding of individuals. Having only been together as a squad for a week, many felt that there was not the basis of relationship in place to be able to challenge effectively, “I’m not sure whether I would or wouldn’t pull you up. I don’t know yet. I probably feel like I’d need to have more of a relationship...Just because I wouldn’t know the reaction I was going to get” (pre-intervention, group 3). Similarly, one of the junior players reflected, “we don’t know each other well enough to know how we’d react to that feedback” (Junior player interview).

Given the lack of understanding evident early in the season, and corresponding unwillingness to risk creating any disharmony, it seemed more likely that the coaches would challenge substandard behaviour. One of the players suggested, “it usually comes from [head coach] more than anyone... she’ll tell you straightaway whether you did sh*t or good... but in terms of coming from team members, we’ve not had a lot of people call people out” (pre-intervention, group 3). Similarly, the head coach reflected, “it’s like *Anna* [international player] the other day when she didn’t bowl straight enough... no one’s going to say that to her, so I had to say it...your coach has to do that” (pre-intervention, staff focus group). There

was a suggestion, however, that challenging conversations between players might be more likely if the environment was engineered accordingly, “it has to be more forced. I don’t think people would just go up to someone and do it. I think it has to be in a set-up environment” (pre-intervention, group 3). This idea led to the utilisation of structured debriefs as part of the intervention to create opportunities for players to engage in open and honest communication about performance.

As alluded to in the method, confidence to speak openly and honestly, provision of feedback, and the challenging of substandard behaviours were all components of the IETI that were targeted by various elements of the intervention. Notably, both safe to speak and feedback improved over the course of the intervention. Staff spoke of observing more cricket-related conversations, “It’s definitely more though isn’t it?... More honest conversations about cricket...” “I think we made progress haven’t we, in the team meetings...” (post-intervention, staff focus group).

The structured use of debriefs- designed to encourage more open and honest reflection of performances- appeared to be the most impactful element of the intervention in this regard. The debrief held following the third loss was spoken about by many of the participants as a significant turning point in the team’s campaign, and the head coach considered it the most powerful element of the intervention,

The meeting that we had after our third loss I think was the most powerful... the girls needed a reality check and they needed to look at themselves and review with one another- I don’t know if I would have gone there without your support so I’m very thankful of that because we did it and the girls were open (Head coach interview).

Where the debriefs through the start of the tournament were largely led by the coaches, following the team’s third successive loss the coaches challenged the players to watch and reflect on their own performances,

We had to sit in groups... and go through our bowling videos and we had to...be brutally honest: 'that was too wide, that didn't hit the stumps', ball by ball by ball and then we had to stand up in front of the whole group and say what we'd commit to for the rest of the [tournament] which I think was really good (Junior player interview).

Although the challenge had to be prompted and role modelled by the staff, "it was a tough meeting but we had everything out and we had tears and all sorts at times and people challenged the sh*t out of me and that was hard" (Head coach interview), the vulnerability shown provided a space in which players could start to have honest conversations and work out how to make the team better, "I think it made us be honest. It gave us a really good reality check and a starting point where to go because it came in at the time when we needed it" (Head coach interview). The result of which was players with a clear purpose and intent for the final two games of the tournament, and a greater willingness to speak openly in front of the group,

I think that [debrief] then, that really drove our next two training sessions, we had such clear purpose to our training sessions. It was such a shame that came that little bit too late. It was so clinical after that (Junior player interview).

Arguably, the team needed to communicate honestly to acknowledge and address the shortcomings in their performances in order to improve, but the final two performances were so far removed from the three previous that the head coach credited the impact of the intervention for the turnaround in performance,

Knowing that we were kind of out of it so that was a bit less pressure enabled us to perform our best cricket and I think if we'd have just performed and got over the line, I'd have been less on the interventions and what we'd done but we didn't, we played unbelievable cricket and we won every game and the bonus point. So it was like one extreme to the other (Head coach interview).

The element of challenge appeared not to progress through the course of the intervention, and evidently required prompting by the coaching staff, “we’ve had to tell them ‘you know, this is not right’, but they don’t do it with each other” (post-intervention, head coach). Based on what was discussed pre-intervention in regard to not knowing how players would react to challenges, it is reasonable to believe that the number of challenging conversations may have increased had the one-page profiles been shared more widely.

The one pagers would have been important at the start because then in a team meeting you could have gone ‘right, I know *Julia* will just take it on the chin if I’d have gone ‘*Julia*, you fielded sh*t, you let yourself down, pick it up’ (Junior player interview).

However, despite the environment being engineered by the coaches, the prompting of honest reflections ultimately enabled the team to be more open with one another.

It would be interesting if we had one more game and we lost it, how we’d be able to check and challenge, because I like to think we’d be more open with each other.

We’ve done things so much better, which... the interventions especially, that has massively helped us. We couldn’t have been two more different teams (Head coach interview post tournament).

In terms of improving the openness of communication, a leadership group was also established to represent the wider group and provide all players with a voice. This element was informed by the focus group narratives, in that the participants reflected, “I feel like [the head coach] is always open for you to come to her if you’ve got an issue, but it’s whether you feel comfortable to go to [head coach] or to one of the team members, because some people might feel more comfortable going to a player than a coach” (pre-intervention, group 3). “If people didn’t feel comfortable saying it to someone- I do think there’s potentially a role for, not necessarily a leadership group, but almost a channel for that to go to” (pre-intervention, group 1). This suggested that providing a way for individuals to feedback to a player they felt

comfortable with could be a means by which to promote open communication, a view that was shared by the head coach, “I think we still need to make sure those girls somehow have a voice and, if they’re unclear on anything, that they need to find a way to speak up” (Head coach reflection).

Understanding & togetherness. It was anticipated that increasing levels of communication through the methods discussed above would impact the secondary aim of the intervention: improving knowledge and *understanding of team members’ personalities and games*. The lower ratings evident pre-intervention ($M = 4.4$, $SD = .55$ and $M = 4.4$, $SD = 1.34$ respectively) were largely reflective of a group that had come together as a full squad only a week previous. Speaking at the end of the tournament the head coach reflected,

The main challenges were that [the team] didn’t have enough time before going into our first game to integrate and get to know each other..., so it was really hard to challenge some really poor cricket because of lack of knowledge of each other’s games and the relationship wasn’t there (Head coach interview).

The narrative in the preceding section suggests that this lack of understanding made challenging conversations more problematic and less likely, as individuals were unsure of the response they would receive. Therefore, the understanding of team members was targeted through the development of one-page profiles and the organisation of social activities.

The *one-page profiles* encouraged the leadership group to speak with individual players about their perceived strengths and weaknesses, and challenges they might encounter to performing at their best. Reflecting on the profile she completed with one of the international players a junior member of the leadership group shared,

[Emma] said ‘if I drop a catch, I know I’ve dropped a catch. I know it’s obviously bad. Just crack a joke, let me get on and take myself back out of my own head and I’ll

get on with it'. And I was like 'OK, fair enough' but I would never have known that (Junior player interview).

This process provided a foundation upon which to build understanding and promote follow-up discussions, as one player reflected, "once you're having a conversation, you can tell people's personalities. Sometimes it's hard to go like 'cool, we're going to start talking about random stuff' - cricket's actually the catalyst" (post-intervention, group 5).

For most participants the one-page profiles appeared to make a positive contribution to the understanding of personalities and games, "I think [the *understanding of personalities*] got a lot higher with increased awareness within the team... [the captain's] one-pagers probably [contributed] as well" (post-intervention, assistant coach). However, the impact of the one-page profiles could arguably have been greater, had they been completed earlier and shared with the wider group. As a result, players would have been better placed to assist one another, facilitating communication on and off the pitch,

We sat down with people on the bus... and took 3 or 4 people each with the one pagers... then it got fed back to [head coach] and never fed back to us, which I think is probably something we should have done... There's no point me knowing, everyone needs to know. There's no point me knowing how *Rachel* works if no one else knows (Junior player interview).

Much of the improved understanding of team members would have been the result of time spent together as a squad. The players, in particular, regarded time away together as important for building this understanding, "I believe the team was in a better place for the first game having been away together, had the experience of travelling together and playing" (Overseas player interview). The organisation of both formal and informal social activities also helped level the perceived cricket hierarchy and brought the team together, "the social side of this team is important, not just players but staff... I think that played a role in bringing

people together best” (Overseas player interview). One of the other players discussed an impromptu visit to a local restaurant,

Everyone got to know each other really well... Banter was flowing around... we were talking about past relationships... it was just hilarious. It was like chat you probably have after 4 pints but with no beer and pizza... it was just nice to get to know each other down a level (Junior player interview).

A possible limiting factor in the development of understanding, however, was a lack of togetherness that was evident in the squad throughout the season,

A couple of key challenges for me that I’ve noticed is that there is developing little groups, so the overseas tend to stick together, and then the younger players, and I haven’t seen either- especially in a non-cricket environment- making much of the effort to interact at this stage (Head coach reflection).

This element of the IETI was a focus of the intervention based on early reflections provided before the arrival of the international players. In speaking about the previous season, players shared, “team things [last year] it still felt quite separated...It was like overseas and England girls who’ve obviously played together and they all know each other from years back and then like the newer, younger groups” (pre-season, group 2). When asked what might benefit the team this season, another player suggested, “the integration of the overseas, the internationals back in the environment...I think it can be quite difficult sometimes when a group has been training for so long and...then obviously people come in that are perceived to be ahead” (pre-season, group 1).

The presence of sub-groups would have prevented individuals interacting with a range of team members, thus limiting the level of knowledge and understanding acquired. The perceived hierarchy discussed previously may have contributed to the lack of togetherness, as

it was considered unusual for domestic players to interact with international players. One domestic player explained,

Anna [overseas player] was like ‘are you going to come over for coffee tomorrow morning?’ and giving me a load of stick...which I think is how we got on. And then someone [domestic player] was like...‘Oh, I didn’t realise you were best friends with each other now’...I was like ‘why, what was the need to say that?’... comments like that I think throw people off so easily (Junior player interview).

Comments such as this would likely reinforce the domestic versus international player subgroups, and although the rating for togetherness was higher post-intervention (pre-intervention $M = 4.3$, $SD = .84$, post-intervention $M = 5.2$, $SD = .84$), the focus group narratives suggested there was little evidence of improvement, “I still don’t think our overseas integrated as well as we would have liked” (Junior player interview). “I think it was very cliquey but not in a negative way. I think the age of players in the group had a massive impact. So like the overseas... and that sort of age, and then there was the younger ones” (post-intervention, group 1).

The positive feedback element of the intervention, designed to bring the team together, was also not completed entirely as planned. Rather than all team members providing positive feedback to one another, individual letters were written.

No one really spoke about the letters between each other, like it was all a very individual thing, but everyone got the letter and then went off and read it... for me it meant something, but obviously for everyone else it was individual so I’m not sure what theirs said” (Junior player interview).

Consequently, the feedback did not necessarily have the intended effect of bringing the team together, “it might have probably had more impact if we again had a bit more time... it didn’t have the right desired effect with the outcome” (Head coach interview). However, as the

letters were given out following the third successive loss, they did provide a timely confidence boost to individuals when it was needed most, “I guess it was nice to have that point of reference as a coach when you know you’ve lost three games and you’re trying to build them up and backing them” (Head coach interview).

Leadership. Items relating to the *head coach* received the highest ratings both pre- and post-intervention (e.g., *Trust in Coach* pre- $M = 6.80$, $SD = .45$, post- $M = 7.00$, $SD = .00$; *Coach Inspiration* pre- $M = 6.80$, $SD = .45$, post- $M = 7.00$, $SD = .00$), thus the leadership provided by the head coach was a key strength of the team. In discussing the extent to which the team trusted the head coach one of the international players offered,

I would go 7 [strongly agree] straight away and I’ve been here for one week... that’s something that’s really strong about this team compared to other teams... I think the fact that you guys all tend to go to [head coach] straight away. I never see you guys split off and I think that can happen in teams where they’re not functioning well... my real feel on just one week is that you guys are all really with her and where she’s going (pre-intervention, group 3).

A member of staff suggested, “I think there’s a lot of players that see a big role model there [in the head coach] and that there’s a lot of investment and time gone into it” (pre-intervention, staff group). In line with original findings regarding the ETI model (Chapter 2), the quality of leadership evident in the head coach positively impacted a number of other features. Indeed, the high rating of *trust in the competence* of team members pre-intervention ($M = 6.4$, $SD = .55$) was largely attributable to the head coach, “[we] have a lot of trust in [head coach] to make the right decisions, so her bringing in the overseas, we obviously have the trust in her making that right decision” (pre-intervention, group 3). In addition, one of the overseas players spoke of how the head coach provided clarity and an understanding of the game plan, “the head coach plays a massive role for someone coming in because you need to

get on the same page really quickly and there needs to be real clarity in the role that we need to play” (Overseas player interview).

Conversely, the level of *trust in the captain* was more equivocal, “the players that haven’t worked with [the captain] before, from the sessions that we’ve had, have not seen her lead as such. And I think that can lead to a bit of lack of trust” (pre-intervention, staff group). Equally, there was little evidence of inspirational leadership behaviours early on, “we hear [head coach] speak every day, but for me I probably haven’t had lots of interaction from [captain] yet to feel that [inspiration] as much” (pre-intervention, group 3). The assistant coach also added, “you’d expect a bit more drive and a bit more passion there and I think she is driven and has a lot of passion, it’s whether it is shown on the outside is what I’d question” (pre-intervention, staff group). Much of this was due to having limited time and experience from which to form a judgement, “I think it will take people time to do that [build trust in captain]. I think it’s how you actually get that to happen quickly is another story... I think the more interactions you can have with the captain” (pre-intervention, group 3). However, the head coach explained that there were reservations of the captain’s ability to lead based on her behaviour in the previous season,

Your captain needs to float and needs more role model behaviours in and around the group, building relationships, and showing support and getting to know individuals.

And because she’s only been with us for a week and a half as well, it’s hard for you to park what happened last year a little bit (pre-intervention, staff group).

One of the junior players expanded, “last year she made no effort to get to know anybody really which I think is hard, but then because she was spending so much time with the overseas” (Junior player interview). This lack of effort invested in leading the team in the previous season represented a significant challenge that the head coach was eager to address in the present season, “the challenges with [the captain] was always at the forefront...

because she had to prove to herself and to the team that she's a worthy captain and put all that other stuff behind her" (Head coach interview).

As such, elements of the intervention were designed to involve the captain and provide opportunities for her to proactively display leadership behaviours. The captain was responsible for leading the one-page profiles, which were devised to enable her to build an understanding of the team. It was hoped that players would recognise the effort invested and develop more trust in her ability to lead. In addition, the leadership group was established to support the captain and share some of the leadership responsibilities.

Post-intervention staff and players all agreed that the captain's leadership had improved dramatically over the course of the intervention; evident in higher ratings across all captain-related elements of the IETI (see Table 4.2), and focus group narratives,

I'm not really sure how [the captain] did that but there was a real change in her, so everyone rated her really highly at the end. I'm not quite sure how she did it, but I would completely agree that she was definitely a good leader by the end (Junior player interview).

Parts of the intervention seemingly contributed to this, and the *captain's close relationship with the head coach* also enhanced the players' perception of her. The strength of trust in the head coach meant that the players had faith in the captaincy appointment, and believed that the head coach and captain would share knowledge to develop a similar level of understanding of team members, "I think what is good about these two [coach and captain] is that they've got a really good relationship, so I think at times I kinda think 'oh yeah, I can tell that's probably come from [head coach]', so I think that one's good" (post-intervention, group 3). Interestingly though, the head coach later reflected that her own leadership style may have stifled that of the captain's, and that perhaps she could have given her more responsibility through the season, "I've got a bit of blame to play in that because whereas

naturally my leadership style is I want to take over ...I think sometimes I don't give enough space and time for [the captain] to take leadership of the team" (Head coach interview).

Nonetheless, the captain invested effort and time in getting to know individuals as staff noticed, "she's worked hard, hasn't she?... I've been quite impressed with how she's gone 'look I'm actually going to get to know everyone'" (post-intervention, staff group), and the one-page profiles contributed positively to the improvement of trust in captain, and captain understanding of others. The head coach reflected,

The one pagers that [the captain] led on with the leadership group, I thought she did a really good job...I think that allowed people's mindsets to shift on [the captain] and what she was about, but she had to work on that and she knew that (Head coach interview).

The effort she invested in getting to know others and trying to avoid the formation of sub-groups was also apparent, "she spent more time and when we had lunch, not just sitting with the [international] girls, she interacted with the girls better from that point of view" (Head coach interview). Furthermore, through the challenging circumstances encountered by losing the first three games of the tournament, the captain was required to lead in order to turn the team's fortunes around. As a result, the players recognised that she was invested in the team where perhaps this had not been as apparent previously, "she had to show her true colours and...[lead]. Instead of going into her shell she just came out of it more, had a bit of a chat, had a bit of a laugh... I think it showed that it meant as much to her as it did to us which we hadn't really seen a whole lot of" (Junior player interview).

Although the captain's leadership appeared to improve through the course of the intervention the head coach shared her frustration at the lack of leadership from those who she considered as senior players, "my biggest issue was between *Louise* and *Sam*, so I've got

two senior players who in their own eyes think they're junior players" (Head coach interview). This observation was also shared by one of the overseas internationals,

My biggest observations were that both *Louise* and *Sam* don't give off a vibe that they are international cricketers and sit back in the shadows. Both exceptional people but I don't know that the domestic girls would 'follow' or be led by those two" (Overseas player interview).

The *leadership group* that was set up as part of the intervention also failed to function quite as intended,

I didn't do it [the leadership group] well enough. If it was done earlier, more structure, really clear on purpose... it made me think 'OK, next time when we have this meeting, we're going to have a proper agenda and I'm going to stage things that they need to go and do" (Head coach interview).

Upon reflection, the leadership group could have been given responsibility for observing and judging the climate of the group to recognise when formal/informal social activities were necessary, "this is where I think if we go back to what the leadership group's about and them understanding the purpose of what the team needs, they're your drivers" (Head coach interview). As the head coach reflected, this was an element of the intervention that could have been more effective and utilised to help develop leadership skills in individuals.

Overall team effectiveness. The data collected post-intervention suggests that the impact of the intervention on the overall effectiveness of the team was somewhat limited. No improvement was evident for the extent to which individuals felt the team worked together effectively as a collective (pre-intervention $M = 79.00$, $SD = 14.75$, post-intervention $M = 79.00$, $SD = 5.48$), nor how well they collectively responded to challenging circumstances (pre-intervention $M = 67.00$, $SD = 13.04$, post-intervention $M = 67.00$, $SD = 17.89$), although there was greater concordance in the rating of the first item post-intervention. The

lack of increase in team effectiveness ratings post-intervention could be explained by overinflated ratings pre-intervention that were largely based on the previous (successful) season, “it felt a bit like people were riding the team’s success from the previous year and felt like it would just roll on, T20 cricket never plays out that way” (Overseas player interview). In reference to the second item regarding team resilience, the staff thought the team had responded positively to the challenge of losing the first three games, “we responded really well... with two games left and the potential to lose five out of five, that was a challenging circumstance in itself” (post-intervention, staff group). However, the team were seemingly unable to respond to challenges that they were presented within matches,

Challenging circumstance down in [away game], didn’t get ourselves to a position where we could win that game. Then [home game], another challenging circumstance with [opposition batsman] going apesh*t... we didn’t respond well to two episodes there” (post-intervention, staff group).

The players were less pragmatic in the reflection of their ability to respond to challenging circumstances, “people were being positive and trying to score runs...so I don’t think people shied away from the challenging circumstances” (post-intervention, group 1), which might explain the discrepancy in ratings.

When considering the degree to which the group performed better than the sum of the talent within the team, the rating actually decreased between pre-intervention ($M = 1.60$, $SD = 0.42$) and post-intervention ($M = -1.20$, $SD = 1.64$). Arguably, these results reflected the team’s poor performances early in the tournament, whereby they only delivered a complete performance right at the end of the tournament, “if our last game was our first game, we would have been disappointed with not winning the final with multiple bonus points” (post-intervention, group 3). In responding to the ‘sum of your parts’ item, the staff reasoned, “we go first three games like minus 2 [worse than the sum of its parts], last two games, 2 [better

than the sum of its parts], so we get a zero... If we just base it on the last game, we were a 4 [team is far better than the sum of its parts]” (post-intervention, staff group). As the head coach suggested, “the interventions especially, that has massively helped us, like we couldn’t have been two more different teams”. Although it would appear that overall the intervention failed to make the team more effective, the head coach’s perception was that it had a significant, positive effect on the team,

I think if we’d have just performed and got over the line [in the last two games], I’d have been less on the interventions and what we’d done. But we didn’t, we played unbelievable cricket and we won every game and the bonus point. So it was like one extreme to the other (Head coach interview).

Discussion

To advance knowledge and understanding of the effective application of teambuilding interventions in sport, Kleinert et al. (2012) recommend that diagnostic tools be developed to allow for the prediction and assessment of changes of single cases. Hence, the aim of the present research was to establish whether a brief, tailored teambuilding intervention based on the IETI (a diagnostic of team functioning) could improve specific elements of cricket team functioning, and overall team effectiveness. A semi-professional, female cricket team received a bespoke teambuilding intervention over the course of a two-week competition. The intervention focused specifically on improving communication, understanding, and athlete leadership. Each of the individual items on the IETI that related to these focal areas (i.e., athlete leadership: *trust in captain*, *captain understanding*, *captain inspiration*, and *lead by example*) improved over the course of the intervention. However, the results revealed no increase in self-rated team effectiveness efficacy beliefs, and a reduction in perceived teamwork, suggesting that overall team effectiveness did not improve through the intervention. Although the team’s performances improved dramatically over the course of the

competition, disappointing early losses ultimately resulted in the team underperforming. Nevertheless, analysis of the qualitative data in conjunction with the IETI results suggested that certain elements of the intervention positively impacted team functioning, most notably the use of structured post-match debriefs, and the focus on improving captain leadership behaviours.

Culture

Within the ETI model a vision of success and set of team values (principles that guide the day to day behaviour of members) contribute to the development of an effective, high-performance culture (see Chapter 2). A vision of success, in particular, has been found to be a strong predictor of teams with high team confidence and teamwork (see Chapter 3). Although these qualities were not targeted in the intervention delivered, it was apparent that the team had a clear purpose that extended beyond winning and provided athletes with an understanding of how to behave in the environment. The findings are in accordance with previous literature which highlights the importance of leadership in creating and regulating high performance cultures (Cruickshank, Collins, & Minten, 2015), as the head coach clearly espoused and embodied the team's vision. Having a vision enables a team to develop psychological safety, understand the purpose and objectives of the organisation, and increases motivation and commitment from team members (Schroeder, 2010).

Communication

Pre-intervention both the IETI and focus group data indicated that many team members were uncomfortable speaking in front of the group, providing one another with feedback, or challenging substandard behaviour. This appeared to be particularly true of younger and less experienced players. The concept of challenge, as assessed by the IETI, appears synonymous with that of voice behaviour; speaking out and challenging the status quo with the intent of improving the situation (LePine & Van Dyne, 1998). Research in

organisational psychology suggests that this act of speaking up with questions, suggestions, and concerns is integral for effective teamwork, yet one of the main obstacles to voice behaviour is lack of efficacy (Weiss, Kolbe, Grote, Spahn, & Grande, 2016). The younger and less experienced players in the present team may have felt less confident in their knowledge than that of their international counterparts. Indeed, Greene and DeBacker (2004) found that females, in particular, are likely to remain quiet when they are not confident.

The focus group narratives also alluded to the presence of a perceived hierarchy within the team; an additional factor which may have contributed to a lack of voice behaviour. Research has shown that individuals with a lower hierarchical status not only have less confidence in their judgements (See, Morrison, Rothman, & Soll, 2011), but do not speak up for fear of others' disapproving their input (Edmondson, 1999), lack of assertiveness (Weiss et al., 2014), and fear of harming relationships (Bienefeld & Grote, 2012). Particular emphasis has been placed upon the role of fear as a key motivator of organisational silence, whereby hierarchical barriers prevent individuals from speaking up for fear of the negative consequences for the self, or for one's relationships with others (Morrison & Milliken, 2000). Thus, for the younger and less experienced players, not speaking up fulfils a self-protective motive (Detert & Edmondson, 2011).

Despite scores for safe to speak and feedback improving over the course of the intervention, the level of challenge remained unchanged. This finding is in line with recent observations of gender differences in sports teams, which suggest that female athletes are less likely to engage in conflict, or challenge one another (Eys et al., 2015; Wachsmuth, Jowett, & Harwood, 2016; Webster et al., 2017). Similarly, in the organisational literature females have been found to exhibit less voice behaviour than males (Detert & Burris, 2007; Le Pine & Van Dyne, 1998). Gender role theories contend that there is a social expectation of communality for females, and that females are likely to have a greater motivation to maintain close relationships (Eagly & Wood, 2011). Therefore, females are likely to avoid direct

confrontation as it is likely to threaten interdependence (Cross, Hardin, & Gercek-Swing, 2011). This finding suggests that further research on underlying gender differences in sport is warranted, particularly in the investigation of voice behaviour on teams.

Based on the post-intervention focus group narratives, the use of objective, post-match debriefs appeared to be the most impactful element of the intervention. The debriefs enabled players to take responsibility for their actions and encouraged more performance specific, open and honest communication. Morgan, Fletcher and Sarkar (2013) suggest that the use of group debriefings and reflections of key incidents promotes learning following adversity, and subsequently contributes to team resilience. This was arguably true of the present team, who bounced back from three consecutive defeats to win their final matches.

Debriefs have been studied across a variety of disciplines (e.g., military, medical, educational, etc.), with meta-analytic results indicating that debriefs (also referred to after action/event reviews) have the potential to improve performance by approximately 25% (Tannenbaum & Cerasoli, 2013). In sport, debriefs have been found to improve team performance, reduce negative emotion effects and foster coach-athlete relationships (Hogg, 2002; McArdle, Martin, Lennon, & Moore, 2010). Most pertinently to the present study is the finding that debriefs lead to greater openness of communication and voice behaviour (Villado & Arthur, 2013; Weiss et al., 2016). It is through the provision of feedback, observational learning, and use of goal-setting that debriefs are theorised to improve performance (Villado & Arthur, 2013). Within the present research, the facilitation of athlete self-reflection in combination with objective, videotaped evidence of performance would have promoted individual agency within team members. This, in turn, may have contributed to lower status members engaging in more voice behaviour (Weiss et al., 2016). Interestingly, Weiss et al. (2016) found that hierarchy beliefs were attenuated and voice behaviour increased to a greater degree in members who participated in assertive after-event reviews which

specifically focused attention on hierarchy-related barriers and voice behaviour. This may be a worthwhile process to explore further in the application of debriefs within sports teams.

Leadership

Quantitative results from the IETI revealed that trust in the head coach, and the positive perception of her leadership qualities were strengths of the team throughout the season. Previous research has found that trust in the leader accounts for a significant amount of the variance in team performance, and is critical to team effectiveness (Dirks, 2000). Trust in the leader has been found to be highly correlated with vision, behavioural norms, and transformational leadership styles (Burke, Simms, Lazzara, & Salas, 2007), which may explain the concordantly high ratings for vision, values, coach inspiration and coach understanding (akin to inspirational motivation and individual consideration respectively) evident in the present research.

Although the leadership provided by the coach could be considered a strength of the team, the captain's leadership was, in contrast, identified as an area for development. Pre-intervention, trust in the captain, captain understanding, and captain inspiration were all rated lower than the corresponding coach-related items. This lack of trust in the captain may have been particularly detrimental to team performances early in the season, as cricket captains are considered to have an enhanced leadership role compared to other sports, given that they make the majority of on-pitch decisions (Cotterill, 2014).

As alluded to above, trust in leadership has been found to have a significant, positive effect on team performance (Dirks, 2000). Followers who feel a leader demonstrates care and consideration will reciprocate this in the form of desirable behaviours. A greater amount of time will be spent on task, and followers are more likely to go above and beyond their job role (Dirks & Ferrin, 2002). Of all transformational leadership behaviours, individual consideration is most strongly positively related to trust in the leader, and a key determinant

of both trust and satisfaction (Podsakoff, MacKenzie, Moorman, & Fetter, 1990). Bass (1985) posits that individual consideration involves paying attention to differences among team members and discovering what motivates each individual. Therefore, the captain's understanding of players was targeted through the development of one-page profiles for each team member. The process of spending time understanding each individual would have improved the captain's familiarity with team members and enhanced communication (Bass, 1985). Accordingly, the level of captain understanding, and trust in the captain improved from pre- to post-intervention.

Despite the improvement in the captain's leadership, the focus group narratives suggested that there was a lack of leadership displayed by other, senior members. The informal leadership provided by 'non-elected' team members helps share leadership responsibilities and ensures a variety of individuals occupy differing leadership roles (Fransen, Vanbeselaere, De Cuyper, Vande Broek, & Boen, 2014). Therefore, the lack of leadership evident across the team may have limited the impact of the captain's leadership on overall team functioning. Current understanding in both sport and organisational literature is that the most effective teams have shared leadership within the team, whereby coach, captain and informal leaders take the lead on various leadership roles (Cotterill & Fransen, 2016; Wang, Waldman, & Zhang, 2014).

Arguably, the lack of shared leadership could have been identified and addressed through the intervention had it been observed early in the season. This suggests that it may be important to deliver dynamic team building interventions that respond to a team's needs as they emerge. The number of hard-working informal leaders was found to contribute to the accurate prediction of effective teams as classified by team performance and informant-rated team effectiveness in Chapter 3, adding credence to the present findings. The absence of shared leadership within the ETI model is not considered a limitation, as such, although it is

evident that further exploration is warranted, given the prevalence of recent research on shared leadership (cf. Cotterill & Fransen, 2016).

Overall Effectiveness

There were no improvements in the ratings of overall team effectiveness items through the course of the intervention; self-rated teamwork actually decreased. Although team effectiveness cannot be accurately represented by team performance alone (Ward & Eccles, 2006), the effectiveness of a team is often tied up with how successful they are. Hence the ratings evident post-intervention are likely to be representative of the team's poor early season performances. Efficacy beliefs, in particular, are determined by previous experiences of success (Bandura, 1997). When confronted with failures, such as those experienced by the present team, team-efficacy beliefs have been found to be vulnerable (Ronglan, 2007). In addition, a negativity bias may have been evident, whereby asking participants to consider how well their team worked together in matches may have resulted a focus on the poorer performances in their campaign (cf. Baumeister, Bratslavsky, Finkenauer & Vohs, 2001). It is reasonable to believe, given the improved team performances at the end of the season, that asking prospective questions about the team's future potential to be effective would have yielded somewhat different results. The effectiveness items were rated based on the entire season, therefore any fluctuations or progression of the team's effectiveness over the course of the intervention were overlooked.

Limitations and Future Research

A strength of the present study is that the intervention drew from results from previous research validating the ETI model (see Chapter 3), whilst also adopting an approach tailored to the team's requirements. Given the dynamic and unique nature of teams, it was inappropriate to rely solely on the results from Chapter 3 to inform the intervention, yet important to interpret the team's results in the context of the variables most predictive of

team effectiveness (e.g., *challenge*, and *captain understanding*). Furthermore, the research was conducted in the field over the course of a team's competitive season, demonstrating high ecological validity. However, the research also had some limitations. First, and most notably, the lack of control group precludes any causal inferences. Second, other than recording the win/loss outcome of matches no performance metrics were available. Third, the coach fed back that it was difficult to deliver multiple elements of the intervention in a short period of time. Indeed, one shortcoming of coach-delivered interventions is that the intervention competes with the demands of coaching. The use of a sport psychologist would have enabled ongoing observation and evaluation of the intervention, whereas this was not possible for the coach. Fourth, the focus group data may have been influenced by the hierarchy that was evident in the team. The finding that players did not feel safe to speak may well have impacted how openly and honestly individuals responded in the focus groups, thus resulting in a more positive profile of team effectiveness.

In light of these limitations, future research utilising the IETI would be well advised to adopt a controlled experimental procedure to enable the inference of causality. Furthermore, the collection of data across numerous time points throughout the season would provide a better insight into the fluctuations of team functioning. Finally, the employment of a psychologist to deliver team-building based on the IETI would allow for the real-time adaptation of the intervention in response to the ongoing needs of the team.

Although the application of post-match debriefs was particularly impactful, there were other aspects of the intervention that were less successful or could have been implemented more effectively. Notably, the leadership group failed to fulfil the objective of sharing leadership responsibilities with the captain. The head coach reflected that the group lacked purpose and structure, thus had limited opportunities to develop or apply their leadership skills other than in the completion of the one-page profiles. Fransen, Vanbeselaere et al. (2014) found that the efficacy of shared leadership resulted from individuals occupying

divergent roles; task and motivational leadership (on-field roles), social and external leadership (off-field roles). Therefore, the identification of suitable roles for members of the leadership group, and the implementation of appropriate training or developmental activities to fulfil these roles may have provided the group with greater clarity and purpose. Furthermore, the provision of positive feedback also failed to have the intended effect, as it was not delivered as prescribed. Rather than all members writing a piece of feedback for each of their teammates, they did so for just one individual. Although this may have increased individual levels of confidence, it is unlikely to have brought the team together in any way. Unfortunately, this element was modified because of the lack of time afforded in what was a very compressed season. Future interventions delivered with teams over a longer period may find this element more effective.

Conclusion

The ETI model represents a novel, practical conceptualisation of team effectiveness in cricket. The present research supports the utility of this model and its application within elite cricket. Practitioners should be confident that the IETI, as a diagnostic tool, can be utilised effectively in the design and subsequent delivery of tailored team-building interventions. Furthermore, the results suggest that bespoke team-building interventions have the potential to positively impact a range of team outcomes in a short period of time.

Chapter 5

General Discussion

This chapter draws together the research aims and findings of the three empirical chapters of this thesis. The main findings of the thesis are summarised, followed by a discussion of the theoretical, conceptual, and applied significance of the results. An analysis of the strengths and weaknesses of the research follows, leading to recommendations for future research directions.

Summary of Findings

The overall objective of this thesis was to examine team effectiveness in professional cricket. Three studies were conducted to fulfil this objective, addressing the following aims: (a) to understand the specific factors that contribute to the development of effective cricket teams; (b) to develop a measure and diagnostic tool of team functioning in cricket; (c) to investigate the factors that contribute most to the accurate prediction of effective cricket teams; (d) to design, deliver, and evaluate a theory-based, bespoke team building intervention with a professional cricket team.

Chapter 1 reviewed the literature as it relates to team effectiveness and group dynamics in both organisational and sport psychology. Particular attention was afforded to the extant frameworks of team effectiveness in organisational psychology, and the mediating mechanisms, referred to as teamwork, which convert team inputs into valued group outcomes. The absence of such conceptual frameworks in sport, with the exception of a recent addition to the literature (McEwan & Beauchamp, 2014), is noteworthy. The literature pertaining to the measurement of team functioning and related constructs, and the development of teams was also reviewed, emphasising the importance of looking beyond cohesion in the design and delivery of team building activities in sport.

Chapter 2 sought to uncover the factors most important for team effectiveness in cricket through an abductive qualitative investigation (cf. Ryba et al., 2012) involving 21 cricket experts (players, coaches, and psychologists competing professionally and

internationally). Analysis of the participant narratives involved successive inductive and deductive processes in order to accurately reflect the experience of individuals, whilst also accounting for the extant organisational psychology literature. Differences between participant role (i.e., player, vs. coach, vs. psychologist) and gender were also examined, providing evidence of potential gender differences inherent in sports team dynamics (see Eys et al., 2015). Based on this elite samples' construal of team effectiveness we proposed a practical, parsimonious, and novel conceptualisation of team effectiveness in cricket; the Essential Team Ingredients model (ETI). The ETI encompasses six broad themes: culture and environment, values, communication, understanding, leadership, and unique individuals, with 27 factors subsumed within these themes. Although the ETI shares elements with existing frameworks - notably Salas et al. (2005) Big Five - the present conceptualisation does not conform to the traditional perspective of a team effectiveness "throughput" model that dominates the literature. Instead the ETI represents a number of fundamental qualities from which the more established group processes develop. The results from this empirical chapter provided a foundation upon which the remaining chapters of the thesis were constructed.

Chapter 3 aimed to develop and validate a measure of the ETI and team effectiveness and adopt this measure in the study of professional cricket teams to determine the relative importance of the various factors within the ETI. To this end, Chapter 3 proceeded in two distinct phases. First, the Inventory of Essential Team Ingredients (IETI) was designed to measure each sub-component within the ETI. In order to minimise participant burden a new paradigm of measurement development was employed to validate a multi-construct, single-item based inventory that could be used for research, evaluation, and quality improvement purposes. Following item development and content validity procedures advocated by Dunn et al. (1999), 18 cricket experts rated the items of the IETI for both match and clarity. Edits were made in response to qualitative comments provided by participants, and analysis of the content validity data suggested that the items had credible validity. This phase resulted in a

31-item IETI designed to assess team functioning based on the ETI, and three team effectiveness-oriented items that represented dependent variables.

The second phase of Chapter 3 sought to generate an understanding of the inter-rater reliability and predictive validity of data gleaned from the items of the IETI, whilst also examining the relationship between team functioning and team effectiveness, and the most important factors of team functioning for team effectiveness in cricket. Thirty-two male and female cricket teams representing the highest level of domestic cricket in the UK participated in the study, with the head coach, assistant coach, and captain from each team completing the IETI and effectiveness items based on their team in the previous season. Objective performance data was also gathered for each team. Inter-rater reliability of the IETI items was calculated using intraclass correlation coefficients (cf. Hallgreen, 2012), and the inter-rater reliability of informant-ratings of team effectiveness was assessed via a novel normalisation procedure which took into account the relative conservatism/liberalism of each rater. For the main analyses the number of variables under investigation along with the small sample size precluded the use of traditional statistical analyses such as MANOVAs. Therefore, pattern recognition analysis; a branch of machine learning that recognises patterns and regularities in data, was used to identify the variables that differentiated between effective and less effective cricket teams. Results from this innovative analysis suggested that certain variables within the IETI accurately predicted an effective team in nearly 90% of instances. Elements of trust, understanding, and leadership were consistently associated with the most effective teams.

Finally, Chapter 4 designed, delivered and evaluated a team building intervention based on results from the IETI. A case-study design was utilised with a female professional cricket team, administering the IETI and effectiveness items prior to the start of the competitive season, and again at the end of the season. The intervention, which included the development of a leadership group; one-page profiles on members' strengths and

weaknesses; structured post-match debriefs; positive individual feedback; and team social events, was based on analysis of the pre-intervention IETI data. The intervention, whilst overseen by the present author, was delivered by the head coach over a two-week period. Results indicated that the elements of team functioning targeted by the intervention (communication, understanding, and captain leadership) improved over the short period, however overall team effectiveness appeared to be more resistant to improvement. This may be explained, in part, by poor team performances early in the season. However, the notable improvement in team performances at the end of the season was particularly encouraging.

Theoretical and Conceptual Issues

A number of theoretical conceptual implications can be derived from the overall findings of this thesis. These include the conceptualisation of team functioning or teamwork, measurement of teamwork and team effectiveness, intervention design, and gender issues in teams. Each of these issues will be discussed in turn.

Teamwork in sport. In certain contexts (i.e., military, aviation, and health care) the ability of a team to work effectively as a collective can influence the outcome of life or death situations. Thus, the importance of understanding the nature of teamwork and the qualities that enable groups to produce performances that exceed the capabilities of an individual working alone has resulted in a proliferate literature on team effectiveness in these domains. Organisational psychology has an advanced scientific understanding of group phenomena, with numerous tools and techniques available to enhance the effectiveness of real world teams (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017). Conversely, our understanding of teamwork in sport is relatively limited, with very little research afforded to the construct until recently. Therefore, one of the major contributions of this thesis is the advancement of knowledge regarding the factors that enable sports teams - specifically cricket teams – to be most effective. Despite presenting a relatively abridged

conceptualisation of team functioning in cricket, the research corroborates previous literature (e.g., McEwan & Beauchamp, 2014) which demonstrates the complex, multidimensional nature of teamwork in sport.

The framework of team effectiveness in sport proposed by McEwan and Beauchamp (2014) has its roots firmly in the organisational psychology literature, including teamwork behaviours such as mission analysis (a planning process), performance monitoring (an evaluation process), and backing up (an adjustment process); processes which may not be readily identifiable in a sporting context. Whilst the extant organisational psychology literature provides an invaluable foundation from which to advance our knowledge on team effectiveness in sport, the utility of such frameworks in sporting environments is somewhat limited. Indeed, Kleinert et al. (2012) argue that the integration of group-related concepts into practice is unsatisfying, thus it is hoped that the utilisation of sport specific language will facilitate better communication between research and practice. Therefore, the present thesis evolves current understanding of team effectiveness in sport by presenting a sport specific framework that is based on the language and experience of individuals involved in elite cricket. It is anticipated that this will increase the practical value of the research findings.

The ETI also differs markedly from numerous frameworks of team effectiveness in the organisational psychology literature. Notably, the logic of an IPO heuristic (McGrath, 1964) has shaped the majority of conceptualisations and much of the research conducted on team effectiveness to date (Mathieu et al., 2017). The IPO heuristic was originally only developed to organise a literature review but was readily adopted as a causal framework to drive research studies (Kozlowski, 2018). However, having to categorise group-related variables as being either inputs, processes, or outputs can be somewhat restrictive. Leadership, for example, is regularly omitted from frameworks and aligned research on teamwork, as it is often conceptualised as an input of team effectiveness. Zaccaro, Rittman, and Marks (2001) argue that effective leadership processes represent one of the most

important factors in the success of teams, yet neither Rousseau and colleagues (2006) or McEwan and Beauchamp (2014) include leadership within their conceptual frameworks. Salas and colleague's Big Five taxonomy (2005), on the other hand, disregards the traditional 'throughput' heuristic, and arguably represents the extant framework with the greatest conceptual overlap with the ETI. Leadership is included as one of the Big Five (along with team orientation, mutual performance monitoring, backup behaviour, and adaptability), and the coordinating mechanisms of shared mental models, closed loop communication, and mutual trust closely reflect three of the central variables in the ETI (understanding, communication, and trust). The Big Five also has a uniquely practical focus and has been successful applied to the improvement of teams in healthcare (e.g., Mayer et al., 2011; Lisbon et al., 2016; Weld et al., 2016).

The ETI does not conform to the traditional IPO perspective, instead reflecting the broader constructs required to build a successful team, as opposed to the specific group *processes* required for efficient *teamwork* that have been the dominant focus of past research. The components subsumed within the ETI represent foundational elements upon which more traditional group processes are formed. For example, coordination; the integration of team members' activities to ensure task accomplishment (Cannon-Bowers, Salas, Tannenbaum, & Mathieu, 1995), is a prevalent feature of various frameworks of teamwork (e.g., Rousseau et al., 2006; LePine Piccolo, Jackson, Mathieu, & Saul, 2008) and is the behavioural result of communication and shared understanding between members (Kozlowski, Gully, McHugh, Salas, & Cannon-Bowers, 1996; Serfaty, Entin, & Johnston, 1998). If a cricket team has clearly communicated the strategy for getting a particular batsman out, this shared knowledge would enable the fielder to coordinate the position and timing of his actions with those of the bowler to ensure he successfully caught the batsman out.

Measurement of team effectiveness. To the author's best knowledge, the IETI represents the first measure of a multidimensional construct of teamwork in sport. The IETI

was found to display noteworthy validity and excellent inter-rater reliability, suggesting that the inventory is a robust tool that can be used for both research and applied purposes. It is hoped that ensuing utilisation of the IETI will enable a more detailed investigation of teamwork within cricket and continue to advance the literature on team effectiveness in sport. Whilst it is possible, given the broad nature of the factors within the ETI model, that the IETI could be adapted for use in other team sports, it is important to recognise that the research was conducted in a very specific context. There may be some items within the inventory that fail to apply to other team sports, as well as the absence of factors that may be significant in alternative team contexts. The priority factors that contribute to team effectiveness are likely to differ in various contexts; particularly in teams that require greater levels of interdependence (Evans et al., 2012). Future research, therefore, would be well advised to adopt the template used within this thesis to determine factors of greatest importance, and design appropriate measures to assess team functioning in different team contexts.

In addition to the significance of developing the first known measure of teamwork in sport, the novel paradigm of measurement design that was implemented in Chapter 2 provides an important methodological contribution to the literature. To be of greatest benefit to applied practitioners working in sport, as well as researchers, a measurement instrument needs to be brief. Participants often have limited attention spans or time available (Konrath, Meier, & Bushman, 2014), which is particularly true of professional athletes and coaches. The utilisation of single-items relating to each component of the ETI model ensured the brevity and utility of the IETI, however it prevented the application of commonly used approaches (e.g., internal consistency, factor analyses) to developing psychometric understanding. Instead, delivery of educational material prior to administration of the IETI was used to ensure participants had a detailed understanding of the ETI model (cf. Hardy et al., 2004; Thomas et al., 2002); a thorough process of content validation was completed (cf. Dunn et al., 1999); the interrater reliability of the various respondents from a single team was

assessed; and predictive validity was determined by assessing the extent to which items within the IETI could accurately discriminate between effective and ineffective teams. This process of measurement design and validation provides an alternative method that future research looking to develop more practical diagnostic tools may wish to adopt. Furthermore, the normalisation and calibration of informant ratings of team effectiveness represents an innovative approach to ensuring rigor that should benefit future research using informant-based measures. For example, Hardy, Bell and Beattie (2013) developed an informant-rated mental toughness questionnaire (MTI). Whilst previous research that has adopted this measure required only a single coach to rate athletes (e.g., Bell, Hardy, & Beattie, 2013), utilisation of the procedure outlined in Chapter 2 would allow multiple coaches to rate multiple athletes (i.e., county coaches rate athletes within their team and national coaches rate a broader sample of athletes to ensure an overlap of ratings), providing a more robust assessment of an individual athlete's mental toughness. There is also potential value in applying the normalisation method to the study of other personality variables in sport (i.e., narcissism, perfectionism, optimism), as many of these are regarded as being either desirable or undesirable characteristics. Therefore, social desirability bias is common, making a reliance upon self-report measures somewhat problematic (Roberts & Woodman, 2015). The use of informant-rated measures would overcome this limitation and enable the assessment of an individual's personality from multiple perspectives (i.e., different coaches, team mates, and/or competitors).

Despite the novel approach to measurement design adopted within the present thesis, there is still significant scope to advance the measurement of team functioning and effectiveness. For example, social network analysis (SNA); a set of methodological techniques that aim to describe and explore patterns apparent in the social relationships between individuals and groups (Scott, 2017), represents a promising method for integrating individual and “groupy” measurement approaches (Borgatti & Foster, 2003). Social network

analysis has been successfully applied to the examination of shared leadership (Fransen, Van Puyenbroeck et al., 2015; Wang, Waldman, & Zhang, 2014), team processes (Kennedy & McComb, 2014), and stress and communication in teams (Kalish, Luria, Toker, & Westman, 2015). Other novel measurement techniques which have the potential to further our understanding of team dynamics in sport include the analysis of textual data pertaining to the team (e.g., Pollach, 2012), the use of wearable electronic sensors to collect large amounts of data related to human interactions and social behaviour (e.g., Chaffin et al., 2017), and the use of emotional face recognition to investigate how displayed emotions influence team-related outcomes (e.g., Liu & Maitlis, 2014).

Intervention design. The principal aim of the present thesis was to gain a greater understanding of the factors that influence team effectiveness in cricket in order apply this knowledge to the development of high functioning cricket teams. Chapter 4 provides preliminary evidence that elements of team functioning can be trained and improved through a targeted team building intervention. It is particularly encouraging that numerous elements of the IETI improved over the course of the intervention given that it was delivered indirectly by the head coach, and over a short and intense competitive period of two weeks.

To date, only a limited number of protocols have been adopted in the development of sports teams (e.g., goal setting, interpersonal relationships, adventure experiences, and task-related variables; Kleinert et al., 2012), thus only modest support has been found for the efficacy of team building in sport (Hedges $g = .43$; Martin et al., 2009). In comparison, team training interventions which target specific teamwork or team functioning competencies have been found to have a significant, large effect on team performance (d (SE) = .92; McEwan et al., 2017). Although the intervention delivered in Chapter 4 is referred to as a *team building* intervention, it was very much based on the principles of team training and designed to address key competencies of team functioning based on IETI data. Therefore, a move away from the predominant focus on the development of cohesion in sport (cf. Beauchamp et al.,

2017; Bruner et al., 2013) is advised, in order to draw upon the extensive body of organisational literature for protocols that target specific team functioning competencies.

Often team building approaches in sport involve a single intervention undertaken with little consideration for what should be changed within the team. As a result, any short-term, beneficial effects on team processes tend to dissipate over the course of the competitive season (Ohlert & Zepp, 2016). Recently, researchers have called for a more systematic approach to team building in sport to ensure that interventions have more lasting effects on team functioning (e.g., Kleinert et al., 2012; Beauchamp et al., 2017). In particular, Ohlert and Zepp (2016) argue that team functioning does not relate to a single process within a team, therefore the specific issues to be addressed must be identified in advance so that activities can be tailored accordingly. Furthermore, they argue that interventions should be based on theoretical and empirical findings and embedded in daily training. Accordingly, the programme of research undertaken within the present thesis is aligned with the method proposed by Ohlert and Zepp and provides evidence to support the utility of applying such method to the improvement of sports teams. Specifically, the research (a) identified key components of effective team performance in cricket (ETI model); (b) utilised a psychometrically sound instrument to diagnose team functioning (IETI), and provided feedback to senior leaders within the team regarding the results; (c) developed an intervention to target the improvement of lower rated team functioning competencies; (d) delivered an intervention that was integrated into daily team activities over the course of the competitive season; and (e) evaluated the effects of the intervention through repeated administration of the diagnostic and the collection of qualitative data. Therefore, practitioners working with sports teams would be well advised to adopt this systematic approach to developing the most effective teams.

Gender in sports teams. The remaining theoretical issue that requires further discussion concerns the evidence of gender differences in the conceptualisation of team

effectiveness in Chapter 2. Interestingly, sport may be one of the few contexts that segregates participants by gender, thus creating unique team dynamics that may not be evident in other settings such as business (Ishak, 2017). Within Chapter 2 both male and female participant narratives alluded to the propensity for females to take honest feedback more personally and linger over criticism. This finding was also reflected in Chapter 4, whereby the female team studied displayed relatively low levels of *safe to speak*, *challenge*, and *feedback*; elements that relate to honesty and communication within the ETI model. These facets of honest communication are akin to constructive feedback, an important adjustment behaviour that enables teams to make changes to ensure goal attainment (Rousseau et al., 2006; McEwan & Beauchamp, 2014). If, as the narratives suggested, male teams are more open to receiving and acting upon constructive feedback it is reasonable to believe that the ability to adapt to the ever-changing demands of performance would be superior in male sports teams.

Whilst the limited sample that was available for the present research (i.e., teams representing the highest level of domestic cricket in the UK) precluded any further investigation of gender differences within the thesis, the findings are in accordance with recent attempts to understand gender differences in the cohesion-performance relationship in sport (Eys et al., 2015). Eys et al. interviewed coaches who had worked with both male and female teams to explore underlying mechanisms behind the stronger cohesion-performance relationship evident in female teams (Carron et al., 2002). The results suggested that social cohesion is more important for female teams; the cohesion to performance relationship is more salient for females, whilst the reverse is true of males (performance to cohesion); the development of cliques or subgroups is a common feature of female teams; and male teams are considered more likely to openly engage in conflict, whereas hostility was likely to be harboured covertly in female teams. Eys et al. concluded that there were some notable differences (as well as some similarities) between male and female sports teams that were

worthy of consideration by those responsible for the development and delivery of team building practices.

When considered in concert with the findings from the present thesis, this evidence attests to an underlying difference in the social interactions of males and females. Research suggests that an interdependence construal (i.e., a focus on relationships with others) is more prevalent in females, whereas an independent construal (i.e., a focus on maintaining autonomy) is more common in males (Cross & Madson, 1996). This is likely to result in females having greater motivation to create and maintain close relationships with others, which would explain the avoidance of conflict and unwillingness to provide feedback to a team member that could be construed as a criticism. However, weak evidence is often used to support gender differences for psychological factors in sport (Etnier, 2011), as empirical evidence regarding the psychological differences between males and females is limited (Eys et al., 2015). Therefore, further, purposeful, theory-driven research into gender differences has the potential to enable more informed prescriptions with respect to the development of an effective group environment in sport. There may be interesting applications of such gender-based research to the investigation of coach-athlete relationships, and the leadership provided by coaches, captains, and athlete leaders of varying genders.

Applied Implications

The research conducted within this thesis provides evidence of the importance of teamwork within cricket. Despite cricket being characterised by segregated interdependence (Evans et al., 2012) and a reliance on accomplished individual performances, the findings from Chapter 3 suggest that dedicating time to the development of group-related factors is likely to contribute positively to team performances. Overall, the PhD provides an example of a robust, theoretical method by which to improve team functioning: identifying the team-related factors most pertinent to performance; diagnosis of current team functioning using an appropriately validated instrument; design of a bespoke team building intervention based on

diagnostic results; delivering an intervention over the course of a minimum of two weeks; and evaluating the effects of the intervention. It is hoped that both coaches and sport psychology practitioners alike will be able to replicate this method in a variety of applied settings. Aside from the implementation of a systematic team building intervention, it is also hoped that applied practitioners working within sport will be able to utilise the IETI as a checklist of team functioning that will serve to facilitate team learning and development.

The intervention delivered in Chapter 4 was based upon the concept of team training; the targeted improvement of teamwork knowledge, skills, and/or attitudes, as well as team processes (Salas & Cannon-Bowers, 1997, 2000). This approach differs to the concept of team building which predominates the sport psychology literature, as it was systematic, delivered in context, and focused on the development of team-related competencies beyond cohesion (cf. Bruner et al., 2013). The results from this Chapter provide preliminary support for the efficacy of such an approach in the development of sports teams, although further research is warranted. A recent meta-analysis demonstrated positive and significant effects of teamwork training interventions on teamwork and team performance (McEwan et al., 2017), suggesting that it would be prudent for practitioners working with sports teams to consider some of the intervention characteristics reported by McEwan and colleagues. Interventions targeting multiple dimensions of teamwork and those that provided experiential opportunities to learn about and practice teamwork were particularly effective. Therefore, sport psychologists would be well-advised to move away from a sole focus on the development of cohesion, to instead consider a teamwork approach to team building.

Notably, Chapter 4 demonstrates that team building interventions can be effectively delivered by coaches and need not be the sole responsibility of a Sport Psychologist. This reflects meta-analytic results which found comparable effect sizes for coach or practitioner led delivery of team building interventions in sport (Martin et al., 2009). It may, however, be worthwhile investigating how coach-led delivery of psychological interventions could be

facilitated through the application of coach education. Although research pertaining to coach delivery of psychological skills is scant, Callow, Roberts, Bringer and Langan (2010) argue that coach education relating to psychological skills is an important direction for further research and has the potential to increase coach confidence and skill. Furthermore, there is also a clear ecological benefit to coaches delivering team building interventions given the greater availability of coaches, and lower relative cost of employing one psychologist to deliver a coach education programme to numerous coaches.

One element of the ETI that consistently contributed to the accurate prediction of effective teams in Chapter 3 was trust. Defined as the intention to accept vulnerability based on positive expectations of the intentions or behaviours of another (Rousseau, Sitkin, Burt, & Camerer, 1998), trust has been found to be significantly positively related to team performance (De Jong, Dirks, & Gillespie, 2016). Findings from the present thesis, aligned with a wealth of literature in organisational psychology (e.g., De Jong et al., 2016; De Jong, Kroon, & Schilke, 2017; Mach & Lvina, 2017) provide compelling evidence for the importance of developing trust in sports teams. However, understanding of *how* to develop trust in sports teams is currently limited, given a lack of research on trust in sport. Research in organisational psychology suggests that trust is based on the understanding of deep level characteristics (i.e., ability, benevolence, and integrity) of the individual to be trusted (Mayer, Davis, & Schoorman, 1995). Sports teams, however, often come together at short notice with limited time to prepare. The Indian Premier League in cricket, for example, acquires the best players in the world through auction and trading with other teams. Players arrive days before the start of the two-month long tournament, are paid large salaries, and are expected to perform in one of the World's most attended sports leagues (Indian Premier League, 2018). Arguably, team members do not have sufficient time to determine the deep-level information required to build trust. Instead, given that initial trust judgements are formed on the basis of affective reactions, trust related schemas, and perceptions of others, individuals could be

trained to become more aware of and control their emotions, preconceptions, and stereotypes in order to accurately calibrate team trust (Wildman et al., 2012). Team members, particularly leaders, could also be trained how to pick up and share deep-level trust cues (acts of ability, benevolence, and integrity) during performance episodes in order to continue to develop trust over the course of a competitive season. For example, a team captain could be encouraged to publicly acknowledge team member strengths and/or selfless actions performed in the interest of the team.

Application of the Research within the England and Wales Cricket Board (ECB)

The ECB were critical stakeholders throughout the research process and played a significant role in informing the research design and methodology, assisting in the recruitment of participants, and promoting the research across the organisation and affiliated bodies. Findings were regularly disseminated via meetings with senior management personnel, but also more broadly through ECB Science and Medicine conferences, and routine engagement with psychology practitioners. All applied psychologists working within cricket were given access to the IETI and associated educational materials, and encouraged to provide the research team with feedback on the applicability and feasibility of the instrument. An abridged version of the research was written for publication in the ECB coaching magazine: *Inside Edge*, and distributed to all Level Three and Four cricket coaches in the UK. In addition, the ETI model currently informs part of the Psychology module in the Level Four coach education, providing candidates with a detailed overview of the model and the IETI, some example results, and discussion of how to utilise the instrument to design appropriate team training interventions.

Strengths and Limitations

The strengths and limitations relating to each empirical study have been discussed in the relevant, preceding chapters. Therefore, the discussion of strengths and limitations herein relate to the thesis overall.

Strengths. A significant strength of the thesis lies in the ETI; a framework of team effectiveness that is the basis for the entire thesis and is distinct from many other team related frameworks developed previously. As far as the candidate is aware, the ETI represents the first conceptualisation of team effectiveness that was informed by the first-hand experiences of those involved in teams, combining the multiple perspectives of players, coaches, managers, and psychologists. The majority of existing models are deductively developed based on literature reviews (e.g., Salas et al., 2005; Rousseau et al., 2008). We sought to capture the significance of both the extant research literature, and participants' own experiences of team effectiveness through an abductive method of inquiry, thus providing the most holistic representation of team effectiveness to date. Furthermore, the ETI informed the development of a team functioning inventory in Chapter 3, and intervention design in Chapter 4, therefore provided a consistent theoretical perspective throughout the entire PhD thesis.

Collins and Durand-Bush (2015) suggest that evidence-based frameworks, such as the ETI, enable a more comprehensive understanding of the team processes required for optimal functioning in a particular context. This, in turn, leads to the development of more context-specific applied strategies and recommendations. This is particularly true of the research conducted within the present thesis which demonstrates applied relevance to the commissioning organisation, the England and Wales Cricket Board (ECB). Whilst the exclusive study of cricket teams somewhat limits the generalisability of the research findings, the high ecological validity of the research ensures that there will be ongoing impact of the research within cricket. An example of this is the inclusion of the ETI in UK cricket coach education materials. The applied nature of the research conducted also provided the PhD

candidate with the opportunity to develop applied sport psychology skills with the ECB and contribute positively to the development of the organisation, and the semi-professional female cricket team studied in Chapter 4.

The application and development of a number of novel processes and procedures, particularly within Chapter 3, can also be considered a strength of the thesis. Examples include the use of an abductive mode of inquiry in Chapter 2, the development of a new paradigm of measurement design, normalisation of informant-rated outcomes and use of pattern recognition analysis within Chapter 3, and the application of a theory-based methodology to the design, delivery, and evaluation of a team intervention in Chapter 4. Whilst this has provided comprehensive and varied research training for the candidate, the thesis also contributes to existing knowledge through methodological, as well as theoretical implications. It is hoped that these methods will be readily adopted in future research in sport psychology.

Limitations. As alluded to above, one of the most notable limitations of the thesis is the exclusive use of a professional cricket sample throughout all empirical chapters, thus limiting the generalisability of the findings beyond the unique team context of cricket. Cricket teams are characterised by less interdependence relative to some other sports teams (e.g., basketball; Halevy et al., 2012), therefore it is reasonable to believe that the factors within the ETI may not accurately represent the ‘essential ingredients’ required in all team sports. Validation of the ETI in a range of team sports represents a worthwhile extension to the research, in order to determine whether there are core components of team effectiveness evident across a variety of contexts. However, as the research was funded by the ECB, this was not a principal concern for the present thesis, as the organisation sought research findings that would provide the maximum competitive advantage for English cricket.

Another potential limitation concerns the degree of subjectivity and interpretation present throughout the empirical chapters. Chapters 2 and 4 relied heavily on qualitative data

from which to draw conclusions, which, in conjunction with the narrow sample studied, further limits the generalisability of the research findings (Steckler, McLeroy, Goodman, Bird, & McCormick, 1992). Whilst Chapter 3 – arguably the most conceptually and theoretically advancing chapter – adopted a quantitative methodology, the use of pattern recognition analysis is also subject to interpretation. Using readily available cricket data and statistics to analyse whether team performances exceeded the sum of individual talent would have provided more objective evidence of the importance of teamwork within cricket and offered a strong foundation from which to base the thesis. However, the data analytics required to address this research question were not available at the time. Furthermore, greater time and greater access to the team studied in Chapter 4 may have provided an opportunity to collect data at multiple time points throughout the team’s season, which would have enabled the application of more complex quantitative analyses, and a more objective assessment of the extent to which team functioning improved.

More definitive conclusions could have been drawn about the efficacy of the team building intervention in Chapter 4 had the use of an “appropriately powered controlled experimental design” been possible (cf. Beauchamp et al., 2017, p. 116). Indeed, the lack of true experimental design within the thesis could be considered a further limitation. However, there are a host a team-related factors that would have made pre-experimental, between-group differences extremely difficult to control within an experimental design. This reflects the challenge of conducting research in applied settings, whereby the goals of the researcher and research institution need to be aligned with those of the funding organisation. To that end, a case-study conducted in the field was of far greater value to the ECB than a heavily controlled laboratory-based study.

A common criticism directed at the existing research regarding team effectiveness is that it fails to account for the dynamic and temporal nature of teams (Kozlowski & Ilgen, 2006). Mathieu et al. (2017) argue that every variable related to teams changes over time,

thus theoretical, methodological and empirical developments are needed to more formally incorporate temporal issues in the study of teams. Arguably, none of the empirical chapters within this thesis sought to address this limitation; each study investigating team effectiveness at a single moment in time. Even through the course of the intervention in Chapter 4 team functioning was only assessed at two-time points, providing limited insight into how components of the ETI varied over the course of the competitive season.

Multilevel frameworks of team effectiveness recognise the temporal nature of functioning via the inclusion of feedback loops that represent episodic processes. These feedback loops suggest that the effect of team outcomes on subsequent mediators is likely to be influential (Mathieu et al., 2008). Indeed, there is strong evidence of a bi-directional relationship between cohesion and performance that supports this contention; group cohesion positively predicts team performance, and team performance positively predicts group cohesion with a similar magnitude (Carron et al. 2002; Filho et al., 2014). In addition, successful team performances have also been found to predict athletes' confidence in their team's ability to be successful (Heuze, Raimbault, & Fontayne, 2006). Therefore, without adopting a measurement approach that accounts for temporal nature of team functioning it is difficult to draw conclusions as to whether an improvement in mediating variables (i.e., those subsumed within the ETI model) leads to improved team performance, or whether better team performances lead to an improvement in mediating variables. The design and application of less obtrusive measures of team functioning (e.g., observation data) would be particularly valuable in seeking to address this limitation and understand the development of team functioning and effectiveness over time.

Future Research Directions

Team effectiveness is still an emerging area of inquiry within sport psychology, therefore there is a host of future research questions which would advance our understanding of the factors that enable teams to be successful. The questions below are organised into three sections that relate to (i) the ETI, (ii) measurement, and (iii) methodology.

Essential Team Ingredients questions.

- 1) Does the relative importance of the features within the ETI differ at various time points of a team's development and/or competitive season? How does the outcome of competitive matches influence the relative importance of ETI features?
- 2) Can factors within the ETI be manipulated to determine whether all elements are 'essential' to team effectiveness? If elements of trust, understanding, and leadership consistently contributed to the accurate prediction of effective teams in Chapter 3, are these three ingredients sufficient for team effectiveness?
- 3) Are there optimal levels of features within the ETI for team effectiveness? Can too much of an feature be detrimental to team effectiveness?
- 4) What is the relative importance of the various factors within the ETI at different levels of sporting participation, e.g., cricket academies?
- 5) How do various team inputs (i.e., personality composition, level of experience, gender, etc.) alter the relative importance of elements of the ETI?
- 6) What is the relationship between other group-related constructs such as cohesion or team resilience with the ETI? Are effective teams better equipped to respond positively to challenging circumstances, thus more resilient?
- 7) How are features within the ETI interrelated, and how do these interactions serve to influence team effectiveness?
- 8) Are elements of the ETI essential for team effectiveness in other team sports (e.g., rugby, soccer, etc.)? Are the elements of the ETI also applicable to sport science support and coaching teams?
- 9) Can a general, as opposed to bespoke, team building intervention based on the ETI improve team functioning and effectiveness in newly formed teams relative to a control sample?

Measurement questions.

- 10) Can a valid and reliable observational (and therefore unobtrusive) measure of the ETI be developed?
- 11) Can we further our understanding of team effectiveness in sport through the application of technology (e.g., GPS) to the measurement of human interactions?
- 12) Can social network analysis (SNA) be utilised to further understand the relative importance of each component of the ETI? Beyond the application of SNA, can Human Factors research be applied to understand and improve team functioning in sport (e.g., Event Analysis for Systematic Teamwork (EAST); Stanton, Baber, & Harris, 2008)?
- 13) Can we develop a more objective measure of team effectiveness that accounts for both team performance outcome and how the team worked together to achieve the outcome?

Methodological questions.

- 14) Can pattern recognition analysis be applied to the study of other group-related constructs in sport?
- 15) Can the normalisation of informant-rated scores be applied to other pertinent research questions in sport psychology?

Unique Contribution

Given the plethora of models on teamwork, this research does not necessarily provide a significant contribution to our understanding of the variables that influence team effectiveness, although it does represent the first attempt to develop an inductive model of team effectiveness that accounts for the experiences of those directly involved in team functioning and performance. Instead, the greater contribution that this research makes to the literature is more holistic in nature. The thesis contributes a process by which to understand,

assess, and improve team functioning by a) seeking to ascertain the attributes of greatest importance to team functioning in a particular context, b) designing an appropriate means to test these attributes, c) use of the aforementioned measure as a diagnostic tool to identify team strengths and weaknesses, d) design of a context specific intervention, tailored to the requirements of the team, e) use of the measure, alongside the collection of qualitative data, to evaluate the efficacy of the delivered intervention.

Conclusion

The research subsumed within this thesis has advanced scientific understanding of group phenomena in sport and has also yielded practical tools and techniques by which to enhance real-world, competitive sports teams. The thesis provides an effective format for understanding, assessing, and developing the factors that contribute to team effectiveness which could greatly enhance current team building practices within sport.

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Appendices

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Appendix A. Interview guide from Chapter 2

Understanding the most important aspects of teamwork in cricket.

WELCOME:

Thank you for agreeing to participate in this research. You are making an invaluable contribution to research that will hopefully inform team practices in cricket and contribute towards further research that will look to improve overall team performance.

The interview should last around an hour and a half and will be audio recorded and later transcribed. You will, at some stage, receive a copy of this back in order to confirm that the transcription is an accurate account of what you said. Are you happy to do so? I want to assure you of complete confidentiality, and all of your responses in any subsequent write-up shall remain entirely anonymous. Please feel free to decline answering any question, and you are free to end the interview at any point.

As you may have read in the overview of the research, this study seeks to find out more about some of the characteristics of cricket teams that enable them to perform at their best. As such I'd like to find out more about your own experiences of teamwork in cricket, and maybe particular things that have stood out for you from teams that you have been involved with in the past. I encourage you to draw from all of the previous teams you have been part of, not just your most recent, or that of the highest representative level. Everyone will have very different experiences of team membership and so there are no right or wrong answers. I want to know about your own experiences and views in your own words.

There are several key areas I wish to explore with you through the course of the interview. Some may come up in the discussion of your experiences, and I will weave in questions relating to those where appropriate, and those that are not raised will be discussed at the end of the interview. There is research literature about teamwork that is not necessarily related to cricket, but may be of relevance. I have a checklist of these things that I will refer back to through the course of the interview just to make sure I've covered them. Some of these you may cover yourself so I will just weave in questions of relevance as you do. To conclude the interview I will ask you to consider which of the qualities discussed are most important to teamwork in cricket, so I will be taking a note of the key areas raised throughout. This will help me keep a record and also serve as a reminder for you. Please don't let this distract you.

You are a source of great knowledge and experience in this area, so your honesty and accuracy is of great value to this research.

1. Introduction/background questions

- i. How did you get involved in cricket?
 - Number of teams (player/coach, levels, qualifications)

2. Indicators of teamwork

- i. Tell me a little about the team that you are part of at the moment, what is going on in the team?
 - Is teamwork important in the group?
 - How, if at all, is teamwork important in professional cricket?
 - In relation to fielding/batting/bowling and training/touring (does it become more/less important in certain contexts?)
 - When does it become less/more important?
 - Is this view shared/to what extent do you think players view teamwork as important?
- ii. What is your experience of teamwork in professional cricket?
 - a. Tell me about the first professional team you were part of
 - b. Tell me about a team you have been part of which you would say best exemplified teamwork
 - What contributes to a team working well together?
 - What characteristics would indicate to you that a cricket team is working effectively as a unit?
 - c. Tell me about the least successful team you have been part of
 - What contributes to teams not being able to work well together?
- iii. What would you consider to be the most important aspects (or one most important aspect) of teamwork in cricket?
- iv. What would a team failing, or about to fail look like? What might indicate that a team is going from good to bad?

3. Other variables

- i. There are a few other aspects of teamwork from research literature that have not necessarily been considered in sport.
 - Describe a situation in which this quality has been present
 - To what extent do you think this quality is important to the performance of a cricket team?

THEMES:

1. *Cohesion*: The extent to which a team comes together and stays together to achieve their shared goals; The extent to which a team comes together socially, away from the sport
 - *Do you think both are equally important in professional cricket?*
2. *Efficacy*: The level of shared belief a team has in its collective abilities to achieve shared goals and expected levels of performance.
 - *Can you describe a team you have been part of that has had a high level of collective confidence? How influential is this in cricket?*
3. *Leadership*: The behaviour of an individual when directing the activities of a team towards achieving their shared goals
 - *Can you tell me about the most influential leader you have had?*
 - *Can you give an example of when you have been a leader?*
4. *Communication*: The verbal or non-verbal exchange of information between individuals
 - *Can you describe instances of effective and ineffective communication? What effect do these have upon the team?*
5. *Team mental models*: Knowledge held by members of the team that enables them to understand the requirements of the task and therefore coordinate their actions
 - *Can you please describe situations where team members have to understand what each other are going to do so they can effectively coordinate their actions?*
6. *Coordination*: Organisation and integration of members' actions to work toward a shared goal
 - *Can you explain the circumstances that might require coordination in cricket?*
7. *Adaptability*: How well a team can recognise a change from what was expected and alter their actions and behaviours to still achieve the same shared goals
 - *Can you describe any situations where your team would need to recognise a change and alter their actions to achieve success? How important was this quality?*
8. *Resilience*: The process by which a team positively and effectively adapts to stressful and adverse events
 - *Can you describe any situations where your team effectively responded to stressful or adverse events? How did this influence performance?*

9. *Conflict*: Disagreements between team members that may be accompanied by negative emotions and/or interference with the attainment of the group's goals
 - *What is the content of arguments/disagreements? Effect of different types?*
 - *How is conflict managed? Examples on and off the pitch.*
10. *Planning*: The way in which a team lays out how they will achieve their shared goals
 - *Can you explain your experience of setting goals as a team?*
11. *Roles*: The behaviours expected of an individual holding a certain position (those prescribed by the organisation, and those that evolve naturally)
 - *What kind of roles are players required to fulfil in a cricket team? What are the consequences of individual not understanding/accepting a role?*

PROMPTS:

Example

- a. Can you provide me with some 'for instances' of when that has been important?
- b. What do you mean by that?
- c. Can you provide a particular example of a team with this quality?
- d. Describe what a team with good/bad _____ looks like?

Outcomes

- a. What are the outcomes for a team that has this quality?
- b. What are the potential outcomes if a team does not have this quality? How effective can a team be without it?
- c. To what extent does this aspect of teamwork affect performance?
- d. How does the presence of this quality improve team functioning or the way a team performs as a whole unit?
- e. Are there any circumstances where you would not want a team to have this characteristic?

Importance in different contexts

- ☐ To what extent is this quality present in training/matches, on tour, on field/off, vs poor/good opposition, or within different sub-teams (bowlers/batsmen)?
- ☐ How important is the quality in training/matches/off the field/on tour? When does it become more or less important?
- ☐ How does being under significant stress or pressure affect this quality within a team?

CONCLUSION:

Are there any other aspects of teamwork in cricket that we haven't covered yet that you feel have an important influence the performance of teams?

Or is there anything else you want to raise?

What one thing has the single most negative effect on a team?

What one thing has the single most positive effect on a team?

Of all the characteristics that have been considered, can you describe whether the team directs any effort towards improving any of these qualities?

Appendix B. Participant table from Chapter 2

Role	Gender of participant	Gender of team	Years involved in professional cricket
Psychologist 1	Male	Male	8
Psychologist 2	Male	Male	5
Psychologist 3	Male	Male	11
Psychologist 4	Male	Male	2
Psychologist 5	Male	Female	5
Coach 1	Male	Male	39
Coach 2	Male	Male	23
Coach 3	Male	Male	16
Coach 4	Male	Female	25
Coach 5	Male	Female	30
Coach 6	Female	Female	31
Coach 7	Female	Female	17
Manager 1	Male	Male	43
Manager 2	Female	Female	20
Player 1	Male	Male	10
Player 2	Male	Male	15
Player 3	Female	Female	14
Player 4	Female	Female	12
Player 5	Male	Male	17
Player 6	Male	Male	17
Player 7	Female	Female	25

Appendix C. Original and modified items for the Inventory of Essential Team Ingredients (Chapter 3)

DESCRIPTION	ORIGINAL ITEM	FINAL ITEM
1a) Vision: A shared idea of a valued outcome for the whole team which provides motivation. It is a long-term team goal.	<i>All players are bought in to the team's vision</i>	The team has a shared vision (long-term goal)
1b) Values: A set of principles that guide the behaviours needed to work towards the team vision on a daily basis.	<i>The team has an agreed set of values that guides the behaviour of team members</i>	The team has an agreed set of values that guides the day-to-day behaviour of team members
2a) Safe to play: A concept based on trust, where the environment enables players to play without fear of being unjustly criticised.	<i>Within this team individuals feel able to play without fear of being unjustly criticised</i>	In this team, individuals play without fear of being unjustly criticised from within
2b) Safe to speak: A concept based on trust, where the environment enables players to speak openly and honestly.	<i>Team members are encouraged to speak openly and honestly</i>	Team members speak openly and honestly about issues of concern
3a) Trust competence: The belief that individuals have the ability to do the job that is required of them by the team.	<i>Team members have confidence in each other's ability to perform their role on the pitch</i>	Team members have confidence in each other's ability to perform what is required of them
3b) Trust intention: The belief that players act in the best interests of the team.	<i>In this team, players can rely on each other to act in the best interests of the team (e.g., in training and matches, when making decisions, etc.)</i>	In this team, players can rely on each other to act in the best interests of the team
3c) Trust in leadership: Players believe in what the leader is trying to achieve and want to play for the leader.	<i>All team members trust the coaching staff/captain</i>	Team members trust the head coach Team members trust the captain
4) Honest challenge: Calling players out on behaviours considered to be outside of the culture and standards of the team.	<i>Team members challenge one another on behaviour that is not up to scratch</i>	Team members challenge one another on behaviour that is below the agreed standards
5a) Constructive conflict: Frank and direct disagreements that are had with the intention of improving the team and its performances.	<i>Team members are comfortable disagreeing in order to improve the team's performance</i>	Team members are comfortable disagreeing in order to improve performances
5b) Destructive conflict: Disagreements that are received as personal attacks, lacking any positive intent, and may include pointing fingers and blame.	<i>The team's ability to be successful is undermined by disagreements that are received as personal attacks</i>	The team's ability to be successful is undermined by disagreements that are perceived as personal attacks
6) Responsibility: Team members reflect honestly on their own performances and take responsibility for their own mistakes.	<i>Team members accept responsibility for their own mistakes and shortcomings</i>	Team members take responsibility for their own actions

7a) Communication- feedback: Feedback given between team members that is given with the intention of improving individual or team performances.	<i>Team members give critical feedback about individual or team performances to make the team more effective</i>	Team members are prepared to give difficult feedback about performances that is intended to make the team more effective
7b) Communication clarity: Clear communication which enables all team members to understand the team goal, game plan, and roles.	<i>Task-related information (e.g. team goals, game plans, and roles) is very clearly communicated across the team</i>	Task-related information (e.g. team goals, game plans, and roles) is very clearly communicated across the team
7c) Destructive communication: Negative communication that is often associated, although not exclusively, with a lack of trust, and has the potential to lead to conflict.	<i>Negative communication from team members (e.g., moaning, making snide remarks, etc.) interferes with team effort</i>	There is regular negative communication (e.g., moaning, making snide remarks, etc.) from team members
8a) Understanding personalities: An understanding of the personalities of individual team members; knowledge of how best to approach and communicate with individuals, as well as provide support and encouragement when needed.	<i>Team members understand each other's personalities and how best to support one another</i>	Team members understand each other's personalities sufficiently to know how best to communicate with one another
8b) Leader understanding: Coach/captain understanding of the differing personalities of individuals on the team; knowledge of how to get the best out of players and communicate with them most effectively.	<i>The coach/captain understands each team members' personality and how to get the best out of him/her</i>	The head coach understands each team members' personality sufficiently to know how to get the best out of him/her The captain understands each team members' personality sufficiently to know how to get the best out of him/her
8c) Understanding games: Understanding the way in which team members play; their strengths and weaknesses.	<i>Team members are fully aware of each other's skills and abilities (e.g., strengths/weaknesses, preferred shots, etc.)</i>	Team members have an in-depth understanding of each other's game
8d) Team mental models: A shared understanding of how the team is going to play. Developed from clarity around a team's vision, goal, plans and individual roles.	<i>Everyone on this team understands how best to approach the team's tasks</i>	Team members have a shared understanding of how the team is going to play
8e) Understanding roles: Shared clarity of individual roles, where team members understand the roles and responsibilities of the other players in the team.	<i>Team members know each other's roles and responsibilities in various circumstances (e.g., in a run chase, after a change of tactics, etc.)</i>	Team members are very clear about each other's roles and responsibilities
9a) Inspirational vision: Coach/captain that is inspirational and passionate in their approach to cricket.	<i>The coaches/captain act and speak in ways that are enthusiastic and inspiring</i>	The head coach inspires the team The team captain inspires the team
9b) Lead by example: Captain that leads by example and role models the behaviours required of the team's culture and values.	<i>The team captain leads by example</i>	The team captain leads by example

9c) Coach-captain relationship: An effective working relationship between the coach and captain which enables them to present a united, cohesive leadership approach to the team.	<i>The coach and the captain have a close, effective working relationship</i>	The head coach and captain have an effective working relationship
10) Unique characters: Individuals who contribute positively to the team through talented individual performances, but also have the potential to disrupt team functioning.	<i>There are players on this team who can win matches, but have the potential to disrupt the team</i>	Some strong players on this team have the potential to disrupt it
11a) Lack of cynicism: A team that is open to change and new ideas, and is willing to implement novel strategies to improve performance.	<i>Players on the team are open to new ideas and change (e.g., the use of new technology, novel training procedures, etc.)</i>	Players on the team are open to new ideas and change (e.g., the use of new technology, novel training procedures, etc.)
11b) Celebration of success: Individuals genuinely enjoy the success of their teammates and come together to celebrate those successes.	<i>All players come together to openly celebrate individual and team successes</i>	The team comes together to celebrate individual and team successes
11c) Togetherness: A team that is marked by an absence of cliques or sub-groups, and spends time together as a collective	<i>The team generally sits together in support of those batting</i>	Team members generally spend time together as a collective rather than in cliques or splinter groups
11d) Fielding: A team that communicates and provides both physical and verbal encouragement in the field.	<i>The team displays encouragement and enthusiasm in the field</i>	The team displays encouragement and enthusiasm in the field whatever the state of the game
Self-rated team effectiveness 1	<i>In matches the players work together effectively as a team</i>	In matches the players consistently work together effectively as a team
Self-rated team effectiveness 2	<i>The team responds positively and effectively to challenging circumstances</i>	The team responds positively and effectively to challenging circumstances
Self-rated teamwork	<i>To what extent do team performances exceed the combined talent of the individual players?</i>	A statement and explanation followed by: To what extent do team performances exceed the combined talent of the individual players?

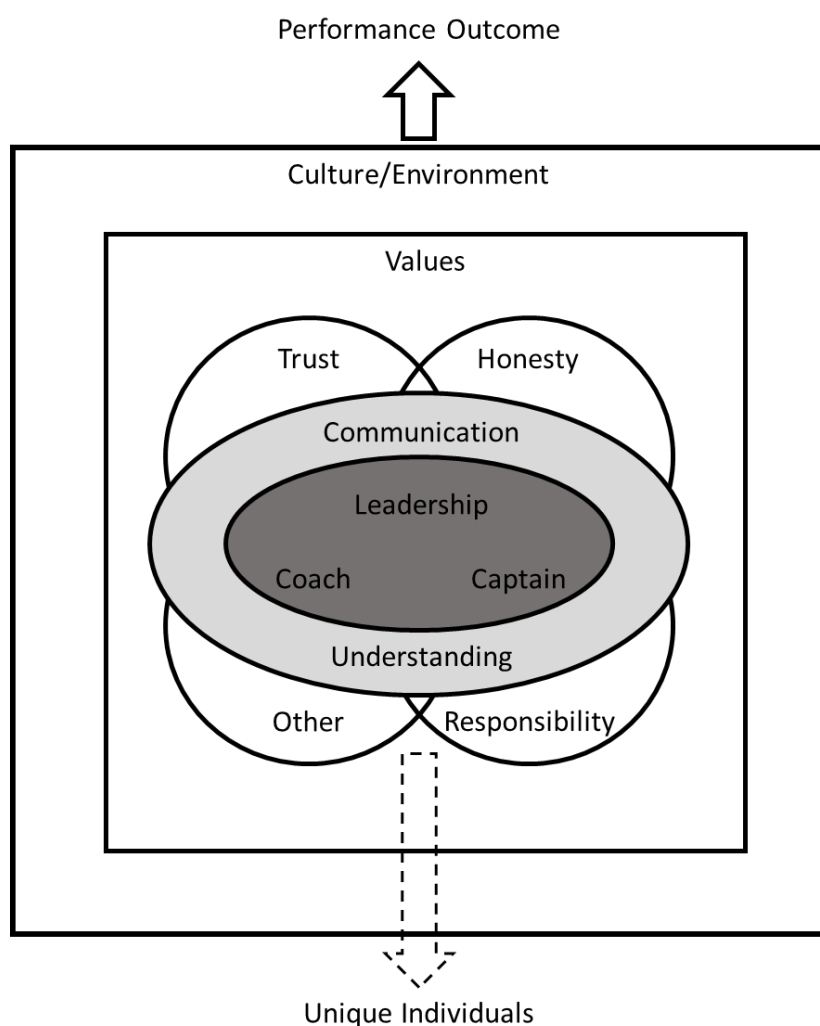
Appendix D. Materials provided for education on Essential Team Ingredients model (Chapter 3 and Chapter 4)

Is your team better than the sum of its' parts...?

Developing a checklist of the essential ingredients of cricket team effectiveness.

As part of a wider strategy to develop a competitive advantage for English cricket, Bangor University, in collaboration with the ECB, wish to understand how some cricket teams produce better results than expected given the players they have. This piece of research forms part of a broader program of research examining team dynamics in cricket. The aim of this research is to share across the English game the critical factors of team effectiveness in cricket. Available to all participants will be a cricket-specific team 'checklist' developed from our research findings.

Fig. Model of Team Fundamentals



Environment

An effective team emerges from a coach-created, captain-reinforced environment and culture that has a clear vision and set of underpinning values.

This ensures that the team move together in the same direction.

Safety

The most effective environment allows players to play free from unjust criticism, and feel they can speak openly and honestly without judgement from within.

Without safety players are guarded in both the way they play, and how they interact with others. The concept relies upon trust and honesty.

Trust

Most commonly cited value that involves a belief in team mates' ability to perform, and a belief in their intention and commitment to the team.

Trust also in what the head coach is trying to achieve.

Without trust honest communication, challenge, and constructive conflict is impossible.

Honesty

An ability to challenge team members on behaviours deemed outside of the culture and standards of the team.

This ensures values are ascribed to, and the desired culture and standards of the side are reinforced, and maintained by the players. Honesty and challenge relies upon trust.

Conflict

A team that is comfortable disagreeing in order to improve the team's performance, but rarely has disagreements that are received as personal attacks.

Constructive conflict enables better decision making and new ideas, whereas destructive conflict unsettles relationships, and interferes with team functioning.

Responsibility

Team members are able to take responsibility for their actions, their successes and shortcomings, and reflect openly and honestly on performances.

Responsibility is the basis from which changes can be made in order to improve performance. By team members being openly responsible it leads the way for others to follow suit.

Communication

The most effective communication is open and honest, and provides clarity on a team's goal, game plan, and roles.

Critical feedback that is given by team members with the intention of improving individual or team performances is also important for moving a team forward, but relies upon trust.

Destructive communication on the other hand, e.g. moaning, snide remarks, is a marker of a lack of trust and honesty and is often associated with conflict.

Understanding

Through open and honest communication team members can develop an understanding of one another's personalities which contributes to effective communication and the provision of support when needed.

An understanding of team goals and game plans, and individual roles, strengths and weaknesses- also developed through open communication- allows individuals to better coordinate with one another.

Leadership

Both head coach and captain as team leaders need to understand the different personalities present in the team in order to know how to get the most out of him/her.

The coach and captain also need to be enthusiastic and inspiring in their pursuit of the team's vision, and always lead by example, role modelling the behaviours they wish to see.

In order to present a single, united vision and goal to the team, the coach and captain must have a close, effective working relationship. They must always publicly support one another.

Unique characters

There may be characters in a team who have the ability to win matches through their individual talent. However they also have the potential to disrupt team functioning. A team does not want too many of these characters, nor get to the stage where they cannot be managed.

Indicators

A number of observable behaviours were raised that may be indicative of a team not functioning as effectively as they could. E.g. being cynical to change and new ideas, not celebrating others' success, not displaying physical togetherness as a team, and being quiet and lacking encouragement in the field.

IS YOUR TEAM BETTER THAN THE SUM OF ITS' PARTS...?

Developing a checklist of the essential ingredients of team effectiveness.

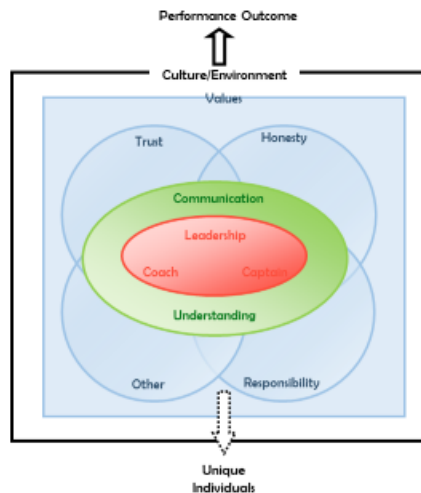
Leonie Webster

STUDY 1: AIM

To gain a greater understanding of teamwork within cricket, and the group level qualities required to become an expertly performing team

- What are the most important aspects of teamwork in cricket?
- Are there any differences in teamwork between male and female teams?

RESULTS



STUDY 2: AIM

To develop and test a “checklist” that can assess the variables that emerged from Study 1 as being critical to team effectiveness in cricket

Examine the validity of a diagnostic tool to:

- Predict successfully functioning cricket teams
- Identify teams that are starting to go off track

Appendix E. Final Inventory of Essential Team Ingredients (as used in Chapter 3 and 4)

To what extent was your County Championship season disrupted by injury?

Not at all		Slightly		Somewhat		A great deal
1	2	3	4	5	6	7

- A. How many players in the side would be considered junior (e.g. within their first 3 seasons of professional cricket)?

- B. How many players in the side would be considered senior (e.g. have played professional cricket for 10 seasons or longer)?

- C. How many players on the team could be described as being 'team players' (i.e. give exceptional effort and can be seen as a workhorse that is willing to sacrifice and put the team before his/her own interests)?

- D. How many players on the team could be described as 'individually-oriented' (i.e. have a tendency to put their own interests before those of the team)?

- E. How many informal leaders (i.e. players *other* than the captain or vice-captain who provide leadership) are there in the side that consistently encourage and motivate teammates?

- F. How many informal leaders (i.e. players *other* than the captain or vice-captain who provide leadership) are there in the side that lead the team by example, hard work, and dedication?

1) The team has a shared vision (long-term goal)

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

2) The team has an agreed set of values that guides the day-to-day behaviour of team members

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

3) In this team, individuals play without fear of being unjustly criticised from within

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

4) Team members speak openly and honestly about issues of concern

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

5) Team members have confidence in each other's ability to perform what is required of them

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

6) In this team, players can rely on each other to act in the best interests of the team

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

7) Team members trust the head coach

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

8) Team members trust the captain

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

9) Team members challenge one another on behaviour that is below the agreed standards

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

10) Team members are comfortable disagreeing in order to improve performances

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

11) The team's ability to be successful is undermined by disagreements that are perceived as personal attacks

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

12) Team members take responsibility for their own actions

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

13) Team members are prepared to give difficult feedback about performances that is intended to make the team more effective

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

14) Task-related information (e.g. team goals, game plans, and roles) is very clearly communicated across the team

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

15) There is regular negative communication (e.g., moaning, making snide remarks, etc.) from team members

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

16) Team members understand each other's personalities sufficiently to know how best to communicate with one another

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

17) The head coach understands each team members' personality sufficiently to know how to get the best out of him/her

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

18) The captain understands each team members' personality sufficiently to know how to get the best out of him/her

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

19) Team members have an in-depth understanding of each other's games

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

20) Team members have a shared understanding of how the team is going to play

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

21) Team members are very clear about each other's roles and responsibilities

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

22) The head coach inspires the team

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

23) The team captain inspires the team

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

24) The team captain leads by example

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

25) The head coach and captain have an effective working relationship

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

26) Some strong players on this team have the potential to disrupt it

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

How many players on the team have both of these qualities/aspects:

27) Team members are open to new ideas and change (e.g., the use of new technology, novel training procedures, etc.)

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

28) The team comes together to celebrate individual and team successes

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

29) Team members generally spend time together as a collective rather than in cliques or splinter groups

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

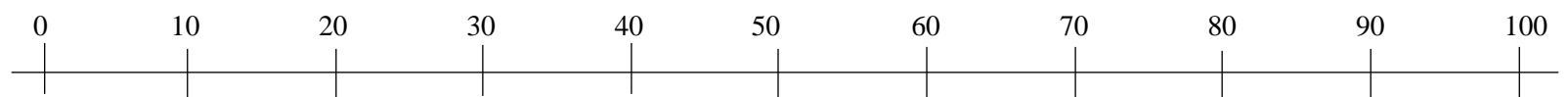
30) The team displays encouragement and enthusiasm in the field whatever the state of the game

Please rate the degree to which you agree that the statement above was true of your team last season.

<i>Strongly disagree</i>	<i>Disagree</i>	<i>Somewhat disagree</i>	<i>Neither agree nor disagree</i>	<i>Somewhat agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1	2	3	4	5	6	7

Effectiveness- Where the previous items have asked you to consider in depth how your team interacted, these final items ask you to think more generally about how effective your team was as a whole last season. When answering this section it is important to consider much more than just the team's actual performance outcomes (i.e. wins/losses), but to think about how well the team interacted in order to achieve those outcomes.

1) In matches the players consistently work together effectively as a team

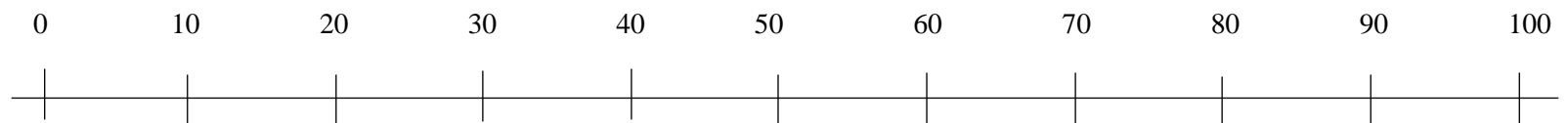


*Strongly
disagree*

*Neither
agree nor
disagree*

*Strongly
agree*

2) The team responds positively and effectively to challenging circumstances



*Strongly
disagree*

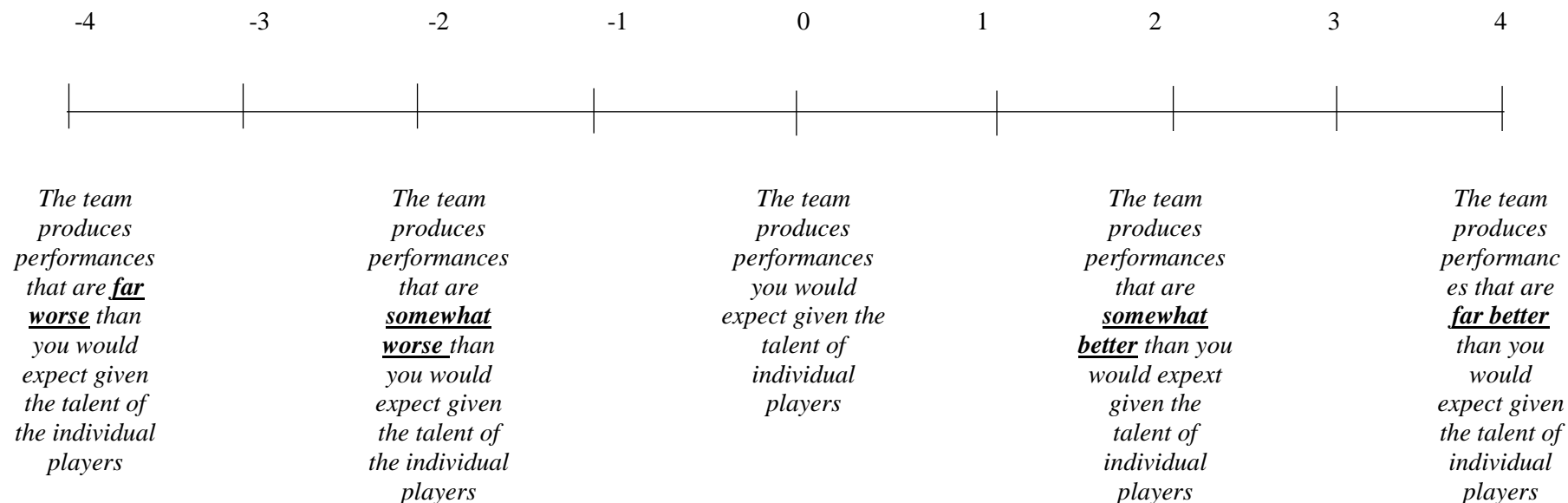
*Neither
agree nor
disagree*

*Strongly
agree*

It was Aristotle who said “*the whole is greater than the sum of its parts*”. There are many sporting examples where a team without any obvious superstars outperforms those teams with many superstars. The German football team are often considered as better than the sum of its parts; consistently winning world championships despite not necessarily having the very best individual players in the world at the time. Great teams do more than just bring together talented cricketers, but they bring ‘value-addedness’. They are able to create team performances that are greater than you would think possible when looking at the talent of the individual players.

Bearing this in mind please consider the following question in relation to your own LVCC team during the 2015 season.

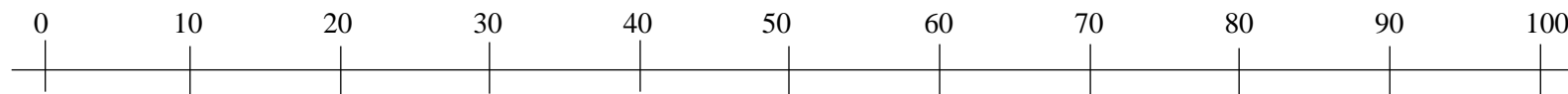
3) To what extent do team performances exceed the combined talent of the individual players?



Other teams: You are now asked to complete the same measure for between 3 and 5 other teams in your league during the 2015 season. Please only rate as many teams as you feel confident providing an accurate score for. This confidence should be based upon the number of times you encountered that team in the 2015 season, and the extent to which you analysed their strengths and weaknesses.

Please provide accompanying rating of confidence by responding with a score (out of 100; 0 = not at all confident and 100 = extremely confident) indicating how confident you are in your assessment of that particular team.

1) In matches the players consistently work together effectively as a team



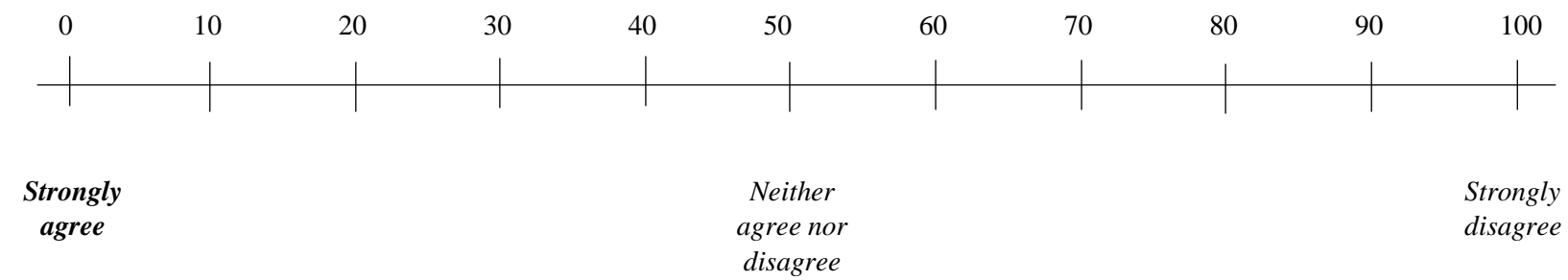
*Strongly
disagree*

*Neither
agree nor
disagree*

*Strongly
agree*

	Team name	Effectiveness rating (0 to 100)	Confidence in your effectiveness rating (0 to 100)
1			
2			
3			
4			
5			

2) The team responds positively and effectively to challenging circumstances

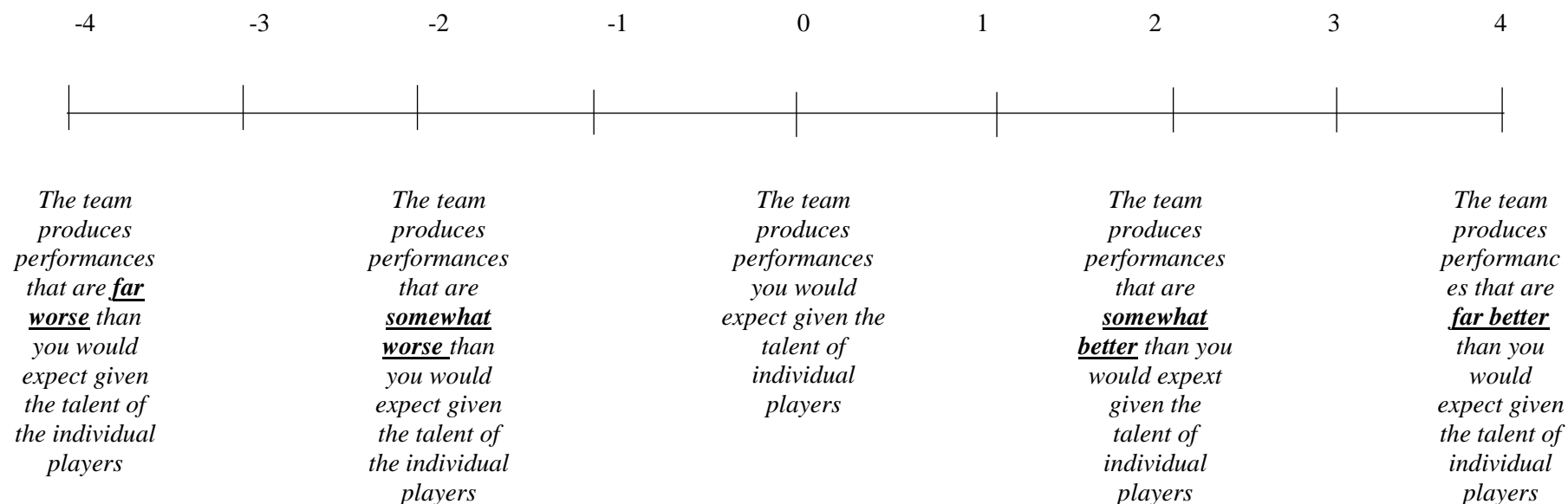


	Team name	Effectiveness rating (0 to 100)	Confidence in your effectiveness rating (0 to 100)
1			
2			
3			
4			
5			

It was Aristotle who said “*the whole is greater than the sum of its parts*”. There are many sporting examples where a team without any obvious superstars outperforms those teams with many superstars. The German football team are often considered as better than the sum of its parts; consistently winning world championships despite not necessarily having the very best individual players in the world at the time. Great teams do more than just bring together talented cricketers, but they bring ‘value-addedness’. They are able to create team performances that are greater than you would think possible when looking at the talent of the individual players.

Bearing this in mind please consider the following question in relation to 3 to 5 other teams in your league.

3) To what extent do team performances exceed the combined talent of the individual players?



Appendix F. Recruitment poster for Chapter 3



Is your team better than the sum of its' parts...?

Developing a checklist of the essential ingredients of team effectiveness.

Bangor University, in collaboration with the ECB, wish to understand how some cricket teams produce better results than expected given the players they have. This piece of research forms part of a PhD, funded by the ECB, examining team dynamics in cricket. A model of team effectiveness has been developed based on results from a previous study. The research team would like to share recent, and cricket specific findings with the counties, discuss potential practical implications, and recruit your help in testing the practicality of this model.

The aim of the present study is to develop a “checklist” that can measure the aspects in the model that have been identified as being critical to team effectiveness in cricket. We wish to determine whether an inventory based on the model can reliably predict successfully functioning cricket teams, and help to identify teams that are starting to go off track. Ultimately, the expectation is that this will become a tool that can be used by appropriately trained individuals in your counties to assess the current state of a team, and provide an indication of areas that may require attention.

We would like to request the assistance of all coaches and captains from both male and female first class county cricket teams in the UK to complete a 28-item inventory that asks you to consider the way in which your team interacts. You may also be asked to complete a four-item inventory that relates to the effectiveness of other teams. This process will last no longer than half an hour. By completing this process face to face, there will also be an opportunity to provide education around the model of team effectiveness if individuals feel this would be of value. Discussion around the model will last no longer than half an hour.

Analysis on the results from this study will determine whether any of the aspects of team effectiveness assessed through the inventory can discriminate between effective and ineffective teams, and provide further evidence of the elements that are most important for successful teamwork in cricket. We are limited by a relatively small number of counties, so your help is particularly appreciated.

Appendix G. Worked (*simplified*) example of normalisation of non-reciprocal informant-ratings from Chapter 3

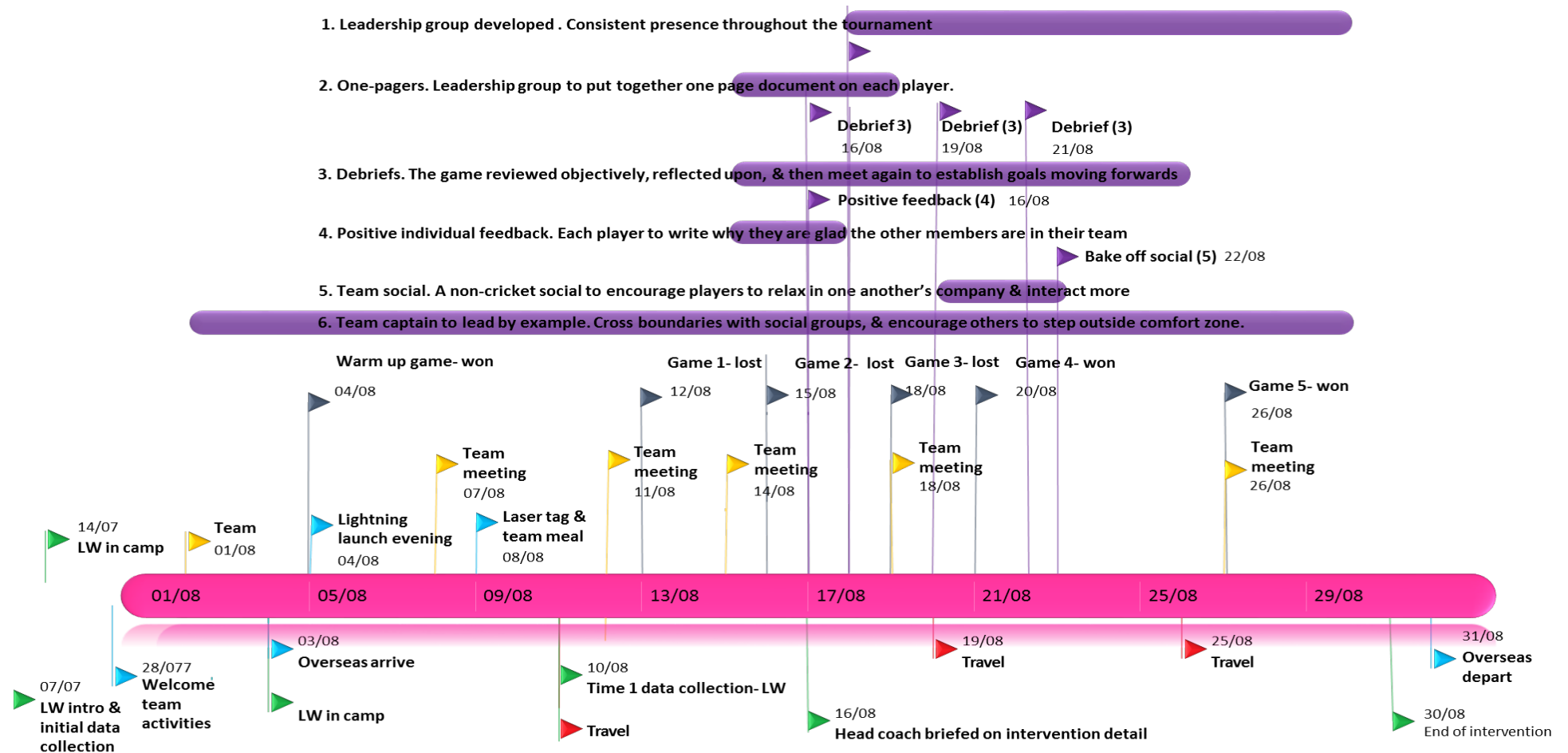
	Team 1	Team 2	Team 3	Team 4	ZTeam 1	ZTeam 2	ZTeam 3	ZTeam4	Zmean	Adj. Team 1	Adj. Team 2	Adj. Team 3	Adj. Team 4
Rater 1	70.00		95.00		-.83		.70		-0.07	74.55		101.18	
Rater 2	70.00	50.00	60.00	50.00	-.83	-.58	-1.14	.71	-0.46	102.2	73	87.6	73
Rater 3	100.00	50.00			1.17	-.58			0.30	70.5	35.25		
Rater 4	90.00	70.00	90.00	30.00	.50	1.15	.44	-.71	0.35	58.95	45.85	58.95	19.65
Mean	82.50	56.67	81.67	40.00						76.55	51.37	82.58	46.33

1. For each team, the informant raters' scores were standardized across that team (i.e., Z scored).
2. The mean of each informant raters' standardized scores across all the teams that they rated was then calculated. This provided an indication of how liberal or conservative each informant's ratings were compared to others informant's ratings.
3. Teams original ratings were then adjusted by the mean value calculated above in order to adjust for the respective conservatism/liberalism using the equation below.

$$\text{Team 1} * [1 - \text{Zmean}]$$

4. The mean of all adjusted informant ratings was then taken for each team (see bolded values in Table 2)

Appendix H. Timeline of intervention delivered in Chapter 4



Appendix I. Interview questions post-intervention in Chapter 4

Questions for interview with overseas player immediately post-intervention

- What was it like for you being part of Loughborough Lightning?
- What were your first impressions coming in to the side?
- What is it like being one of the big international signings for a team?
- How do you think the experience of an international super league player differs from that of the English players?
- What did you find difficult about coming in to the squad?
- What helped the transition into the squad?
- Have you been in a similar situation previously? What was done then to bring the team together quickly?
- How would you describe the team now, at the end of the tournament?
- How does that differ to how you might have described the team at the beginning of the tournament?
- What one thing, over the course of the tournament, helped bring the team together best?

Questions for interview with head coach immediately post-intervention

- Tell me a little bit about what the team was like at the beginning of the tournament. What your impressions were. Any challenges in particular?
- How well did they integrate as a team and sort of interact?
- What about the team now? Where's the team at now at the end of the tournament?
- What have been the most noticeable changes for you?
- What would you say were the key strengths of the team now?
- Did any of the challenges that you kind of saw at the start of the tournament remain or did they, were you able to address them during the course of the tournament?
- What impact would you say the intervention had overall?
- The positive feedback bit, how did that work?

- Were there any challenges you faced throughout the intervention? Was there anything that was kind of different about the delivery of it?
- What one thing, would you say, over the course of the tournament had the most positive impact on the team?
- What would you do differently in future?

Questions for interview with junior player one month post-intervention

- During the course of the season, what interventions were you aware of?
- What did you see as your remit as part of the leadership group and where?
- What was most valuable to you or what did you learn the most about someone through doing the one pagers?
- My thoughts on your reflections after the second game was really flat and it sounded like you were disappointed that there seemed to be nothing team related at all at the end of that game. How did the team come back together after that?
- What purpose did the letters serve for you and how do you think they were received by the group?
- Do you think it had any impact on the group?
- You mentioned the de-brief after the third game. Was that a marked difference that you noted in between how that de-brief was run compared to the ones previous to that?
 - Did it bring the group together?
 - In what way?
- What about the non-cricket socials that you did?
- How was the bake-off? How was that received?
- Do you think the team progressed during the course of the season? Did it feel different at the end to what it did at the beginning?
- Most of the groups rated the captain a lot higher at the end of the season. What do you think are the main things that contributed to that?
- Any other reflections on the team or what kind of helped or hindered during the course of the season?
- Have you spoken to anyone from other teams in the league, what they do to integrate?
- What one thing would you change for next season?

Questions for interview with head coach one month post-intervention

- What did the de-briefs after the first couple of games look like then in comparison? What was your normal approach to those?
 - Generally did they tend to be led by you?
- After we spoke on the phone on the 16th, what was the first thing you did following that?
- When was the leadership group established and was that sort of formalised and who was in it
- Do you think the players saw them as a leadership group and knew what their purpose was and saw them doing anything?
- How did they decide who was seeing who? Or who would do whose one pager?
- What was done with the one pagers? How were they shared?
- When you asked the girls to do the positive feedback piece, what was the response? Or how do you think it was received, kind of at the time and when it was delivered?
- When was the bake-off social? And what did you see as the objective of that?
- Do you think it was successful in achieving what you wanted it to in that respect?
- What size groups were they in for the bake-off and how were they put in groups?
- What other sort of social stuff was there that went on that was less formal?
- What would you say the captain did visibly or noticeably to lead by example and develop a better understanding of the rest of the players?
- What were the main things that came out of your full season review?