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**AN INVESTIGATION OF THE PREVALENCE AND MEASUREMENT OF  
TEAMS IN ORGANISATIONS: THE DEVELOPMENT AND VALIDATION  
OF THE REAL TEAM SCALE**

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**Doctor of Philosophy**

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**May 2010**

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ASTON UNIVERSITY

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**THESIS SUMMARY**

This thesis begins with a review of the literature on team-based working in organisations, highlighting the variations in research findings, and the need for greater precision in our measurement of teams. It continues with an illustration of the nature and prevalence of real and pseudo team-based working, by presenting results from a large sample of secondary data from the UK National Health Service. Results demonstrate that ‘real teams’ have an important and significant impact on the reduction of many work-related safety outcomes. Based on both theoretical and methodological limitations of existing approaches, the thesis moves on to provide a clarification and extension of the ‘real team’ construct, demarcating this from other (pseudo-like) team typologies on a sliding scale, rather than a simple dichotomy. A conceptual model for defining real teams is presented, providing a theoretical basis for the development of a scale on which teams can be measured for varying extents of ‘realness’. A new twelve-item scale is developed and tested with three samples of data comprising 53 undergraduate teams, 52 postgraduate teams, and 63 public sector teams from a large UK organisation. Evidence for the content, construct and criterion-related validity of the real team scale is examined over seven separate validation studies. Theoretical, methodological and practical implications of the real team scale are then discussed.

**Keywords:** team, team-based working, real team, pseudo team, team realness

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## Chapter 1: Introduction

### 1.1 BACKGROUND

The business environment of the 21<sup>st</sup> century has so far demanded organisations to do more and more with less and less. Rapid technological innovations coupled with increased interdependency between job functions means that more organisations are transforming their traditional hierarchical structures into flattened multi-team systems, under the intuitive premise that team-based organisations can learn more quickly, accomplish more efficiently and adapt more effectively (Mohrman, Cohen, & Mohrman, 1995). Research by the Industrial Society (1995) found that 40% of personnel managers reported that their organisation had some form of self-managed teams. Similarly, a study of United Kingdom manufacturing companies found that *'most employees were in formally designated teams'* (Cully et al., 1998; p.10). Similar trends have been found in the United States, Australia and Switzerland (e.g. Clegg et al., 2002) suggesting that team-based working is becoming a global form. Osterman (1994), for example, reported that 54% of leading organisations in the US use teams. Indeed, organisations have long been aware of the benefits that teamwork can offer in chaotic contexts (Lewin, 1951). In the next chapter evidence presented that suggests that the use of teams in organisations has the potential to positively impact many important performance-related outcomes. As a result, *'interest in team-based systems of work organization appears to have reached new heights'* (Delbridge, Lowe, & Oliver, 2000; p.1460).

However, this thesis proposes that there remains a fundamental challenge in the study of teams. Given the excitement that surrounds the use of teams, the general premise that team working will generate superior outcomes has become over-inflated in popular literature. The 'team' label has become intuitively appealing in organisations, in which managers generously assign it to all sorts of collectives of individuals and groups (Sennett, 1998), with the belief that just by doing so, performance-related outcomes will be enhanced. This has been termed by some as the *'romance of teams'* (Allen & Hecht, 2004) given the assumption that teams are a panacea for high performance. As a result, copious collectives of individuals in organisations believe that they work in a real team, when in fact they may just be a team by name only. Learmonth (2009) also argues that academic organisational analysis adopts the term 'team' liberally with seemingly indiscriminate use. Therefore, as team researchers we are often unclear and/or inconsistent in our understandings of what defines a real team theoretically, as well as what constitutes a real team practically when we go out to study

teams in real-life organisational settings. When relying on managers in organisations to identify teams for our research, we too often assume that these entities are those we wish to study.

## **1.2 RESEARCH AIMS**

The aim of this thesis is two-fold. Firstly, given the popularity of team-based designs in today's organisations, the first aim of the thesis is to provide an insight into the prevalence and state of work teams in one of the largest employers in the world, the UK National Health Service (NHS). Secondly, the thesis aims to develop and extend existing conceptualisations of real teams to establish a new set of criteria which form a continuum on which teams can be measured in terms of how 'real' they are. The development of such a measure is crucial to ensure that we are able to recognise the true processes and outputs of real team working, and avoid drawing important conclusions about all work teams on the basis of research with pseudo teams or other organisational groupings which masquerade under the title of 'team'. Indeed, when doing research with teams in organisations, we must first be clear about exactly what sorts of teams we are dealing with. I therefore propose that a more rigorous and scientific approach is required when researchers approach organisations looking to study teams. It is hoped that this thesis will lead to a reflective pause on research into teams, with the purpose being to develop a parsimonious and validated approach for identifying and measuring the realness of teams in organisations.

## **1.3 THESIS OVERVIEW**

Chapter 2 opens with an overview of the literature on team working in organisations. It discusses what team-based working is and why it has become so prevalent in organisations. The historical origins of teamwork are considered, as well as more recent models of team effectiveness which guide research today, with discussion primarily around Input-Process-Output models. Evidence for the positive impact of team working on a variety of important organisational outcomes is also reviewed. However, based on inconsistencies in research findings, arguments against team-based working are also presented, pointing to the need for greater clarity in our research findings, as well as the imperative for precision in the measurement of teams. Overall this chapter sets the scene for the remainder of this thesis by outlining the broader field within which this research is embedded.

Chapter 3 presents the first empirical study of the thesis, examining the prevalence and nature of teams in one of the world's largest employers, the UK NHS. In exploring the impact that different types of team have on important work-related safety measures in the healthcare context, this chapter introduces the concept of 'real teams' which emerges as the key focal construct in this thesis. In adopting a categorical approach for conceptualising and measuring 'real' and 'pseudo' team typologies, results presented in chapter 3 indicate that real teams have an important and significant impact on work-related safety outcomes, in terms of performance and individual well-being. Overall, the findings suggest that if team-based working is the chosen work design, then healthcare organisations should ensure that they are comprised of real teams, as opposed to pseudo team typologies. In discussing methodological issues relating to the measurement of real teams, the study presented in this chapter not only provides clear evidence for the current prevalence and nature of team-based working in today's healthcare organisations, but also acts as a precursor for the scale development and validation which comprises much of the remainder of the thesis.

Chapter 4 proposes the core theoretical contribution of this thesis by providing a new and extended conceptualisation of the real team construct. As team researchers, we need to be able to define *what are teams* and research those, rather than accepting taken-for-granted categorisations offered by managers in organisations. Therefore chapter 4 provides a rigorous clarification and extension of the real team construct, demarcating this from other pseudo-like team typologies on a sliding scale, rather than a simple dichotomy. A conceptual model for defining real teams is presented, which provides a theoretical basis for the development of an instrument on which teams can be measured for varying extents of 'team realness'.

Chapter 5 provides a detailed overview of the methodology adopted for the development and validation of the real team scale. Firstly, the philosophical paradigm and methodological approach which guided the research are discussed, before providing a summary of the different types of validity which are investigated. An overview of the research design is then presented which summarises the seven validation studies which comprise chapters 6 and 7. Finally, a detailed description of each of the three samples from which data are drawn is presented, including data collection procedures, measures, research setting, access and ethics, and the preparation of data for statistical analysis.

Chapter 6 reports results from the first two validation studies which focus on the content validity of the new real team scale. Validation study 1 describes item generation procedures whereas validation study 2 is primarily concerned with the psychometric

properties of the new scale. The chapter details an initial investigation into the structural validity of the new scale using exploratory factor analysis and reliability estimations. Following this, confirmatory factor analysis techniques are used to refine and re-test the model, thus further establishing the structural and content validity of the real team scale, which is consequently reduced to twelve items. Finally, the psychometric properties and test re-test reliability of the twelve-item scale are reported using data from a third sample of teams.

Chapter 7 goes on to report further evidence for the validity of the real team scale using data from three samples of teams. As all of the analysis presented in this chapter is conducted at the team level, the chapter opens with a discussion of multi-level theory. Five separate validation studies are subsequently presented which together explore the concurrent, convergent, discriminant and predictive validity of the new scale. Overall, results indicate good empirical support for validity of the real team scale.

Finally, chapter 8 provides a general discussion of the findings and conclusions of this research. A brief summary of the main aim of this thesis, along with the major findings is presented. The chapter then provides a detailed discussion on potential contributions to knowledge. This includes both theoretical and methodological contributions to the literature on teams, as well as practical contributions that can be used to inform teams and organisations. Following this, overall limitations and caveats of the research are considered, before outlining the main areas for future research. The chapter closes with the overall conclusion from this thesis.

## **Chapter 2: Team working in organisations**

### **2.1 CHAPTER SUMMARY**

This chapter explores the prevalence of team-based working in today's organisations. It begins by outlining a definition of team-based working before considering the historical origins of teamwork. Models of team effectiveness are then reviewed to provide a rationale for team-based working. Discussion is primarily based around the Input-Process-Output model. The next section considers the wider organisational context within which teams are embedded and how external factors such as organisational climate and human resource practices can impact team performance. Following this, a body of evidence from seminal studies on team working is reviewed, specifically with regards to operational, financial, structural and team member outcomes. The chapter closes with a discussion relating to inconsistency of research findings on the use of teams in organisations and the need for greater clarity over the concept and precision in the measurement of work groups and teams in future research. Overall this chapter sets the scene for the remainder of this thesis by outlining the broader field within which this research is embedded.

### **2.2 WHAT IS TEAM-BASED WORKING?**

According to Kozlowski and Bell (2003) team-based designs are becoming 'the norm' in many of today's organisations. This is no surprise given the competitive and fluid milieu in which today's organisations operate, as well as a trend towards more flattened organisational structures (Devine, Clayton, Phillips, Dunford, & Melner, 1999). Due to the ever increasing demand on organisations to address their coordination needs in a more efficient and timely manner, traditional, bureaucratic models are considered inadequate, with teams being the preferred design choice. Such a significant change reflects the belief that team-based working affords the flexibility required to respond to the challenge of ever-changing environments (Salas, Sims, & Burke, 2005). Further, it provides a crucial mechanism for synthesising the wide range of knowledge, skills and abilities of team members in order to complete the increasingly complex work tasks that organisations present.

Theorists argue that team-based organisations can learn better, change more easily and execute more efficiently (Mohrman et al., 1995). They can also retain learning more effectively (Senge, 1990). Due to the need for consistency between organisational

environment, strategy and structure, teams have been described as the best way to enact an organisation's strategy (Galbraith, Lawler, & Associates, 1993). Further, they promote innovation and improved quality management due to the cross-fertilization of ideas, as well as developing and delivering products and services in a cost effective and timely manner (West & Markiewicz, 2004). Cycle time, speed and time-to-market can all be compressed if activities which were previously performed in an individual, sequential manner are instead performed concurrently (Mohrman et al., 1995). Indeed, Galbraith (1994) argues that the complexity of demands and performance pressures placed upon today's organisations are gradually exceeding the capability of traditional, functional organisations. In order to integrate and coordinate such demands, more effective and efficient processing of information is needed. Teams offer this facility.

But what exactly is team-based working? Team-based working reflects the belief that by organising work in a way which formally optimises collaborative opportunity and capability, superior individual and organisational outputs can be achieved. West and Markiewicz (2004) describe team-based working as an approach to organisational design whereby decisions are made by teams of people rather than individuals, and at the closest possible point to the customer or client. The core building blocks of team-based organisations are teams; teams lead one another and form the basic units of accountability and work (Harris & Beyerlien, 2003). Team-based organisations differ in fundamental ways from traditional, bureaucratic models (Mohrman et al., 1995). Traditional organisations are characterised by hierarchical command structures with various status levels such as supervisors, managers, senior managers, up to chief executives. Conversely, team-based organisations are comprised of collective structures in which teams orbit around senior management teams in a fluid and flexible manner, whereby both influence and impact on one another. This is far from the directive and mechanical structure which characterises traditional organisations.

In team-based organisations the emphasis is not on vertical power relationships, but on achieving a shared purpose and understanding and the integration across teams (West & Markiewicz, 2004). In effect, the hierarchy which dictates power is flattened and autonomy is distributed across the organisation via horizontal integration. Further, while traditional organisations emphasise stability and continuity through the reinforcement of rules, regulations and bureaucracy, team-based organisations welcome change, flexibility, responsiveness and innovation, allowing them to adapt quickly and competitively to their external environment. A culture which supports creativity and innovation is crucial, encouraging teams to express and implement unique approaches and ideas. Such an

environment helps to cultivate fresh ways of working and novel solutions which best meet the needs of the ever changing market place. In terms of control and management, traditional organisations assign this to those in supervisory and management positions. Conversely, in team-based organisations, teams themselves take responsibility for setting and meeting their objectives, as well as monitoring and reviewing their processes and strategies. Therefore, team-based organisations must reflect the belief that organisational goals will be largely achieved by teams of individuals working cooperatively together, rather than individuals working in isolation. They must promote the development of shared objectives by involving all employees, encouraging the exchange of their ideas through constructive debate and providing them with a say over decisions (West & Markiewicz, 2004).

The current enthusiasm about team-based working in the literature signifies the recognition that effective team work offers the potential for simultaneously increasing both productivity and employee satisfaction (Campion, Medsker, & Higgs, 1993). There is a common belief that through combining the efforts of individuals within a team, the aggregates of individuals' contributions will be surpassed (West, Borrill, & Unsworth, 1998). Guzzo and Salas (1995) attribute an increase in team-based working to intended improvements in organisational productivity, customer service and an eventual beneficial impact on the bottom line. Of course, it should be noted that team-based organising is not appropriate for every task or every function within an organisation.

### **2.2.1 The history of teamwork**

The activity of a group of people working interdependently towards the achievement of a common goal is fundamental in human social behaviour. For tens of thousands of years, humans have sought membership of stable and structured social groups. Such social impulses have an evolutionary basis, given the survival benefits of forming and maintaining social bonds. As already discussed, teams now also represent the dominant work form in today's organisations. The theoretical rationale for team-based working is discussed later. A brief history of the study of groups and teams will first be provided.

Just as the design of organisations has shifted from a traditional to a more team orientated design, the study of groups and teams has also seen a change in research focus, from the study of small interpersonal groups in social psychology, to the study of work teams in organisational psychology (Kozlowski & Ilgen, 2006). As Levine and Moreland (1990) noted, small-group research *'is alive and well and living elsewhere (outside the confines of*

*social-psychology laboratories*)' (p.620). Moreland, Hogg and Hains (1994) also explicitly recognised the relative decline of group research in social psychology. Indeed, since 1990, an increasing number of work-team literature reviews have appeared in the organisational psychology domain (e.g. Bettenhausen, 1991; Cohen & Bailey, 1997; Guzzo & Dickson, 1996; Hackman, 1992; Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Mathieu, Maynard, Rapp, & Gilson, 2008; Salas, Burke, & Cannon-Bowers, 2000). Beyond this, literally hundreds of primary studies and several meta-analyses have been carried out adding to the enormity of the body of literature on work teams (cf. Mathieu et al., 2008).

Scientific interest into group effectiveness can be traced back to the Hawthorne studies (Roethlisberger & Dickson, 1939) of the early twentieth century, when it was first recognised that inputs and processes of work teams can both enhance and reduce member output (Sundstrom, McIntyre, Halfhill, & Richards, 2000). Over the subsequent years the concept and practice of team-based working has become embedded in a variety of different work systems including Socio-technical Systems Theory, lean production, and human resource management (Applebaum & Batt, 1994; Benders & Van Hootegem, 1999). Socio-technical systems (STS) theory identified the importance of aligning both the technical and social systems of an organisation, in order that they were consistent and coherent and reflected the demands of the external environment (Emery, 1959). The goal of STS is the principle of joint optimisation (Emery, 1995), whereby the organisation will only function at an optimal level if the social and technological systems of the organisation are designed to meet the demands of each other, as well as the wider environment. The STS approach of organisational design provided a basis for the development of autonomous work (e.g., Katz & Kahn, 1978) and, as will be discussed later, empirical evidence for the effectiveness of such interventions is generally positive.

### **2.2.2 Defining teams**

Scientific interest in teams dates back to the 1950s, and various attempts have since been made to define teams (e.g. Alderfer, 1997; Hackman 1987; Katzenbach & Smith, 1993; Guzzo, 1996). Although many of these definitions share attributes, they also include subtle differences and there remains no generally shared definition (Delarue, Van Hootegem, Procter, & Burrige, 2008). In a review of 55 peer-reviewed papers, Rasmussen and Jeppesen (2006) agree that there is no universally accepted definition of a 'team' in the literature. The definition of a team therefore forms the key focal point for this thesis and is discussed in

depth in Chapter 4. However, for the purposes of introducing the concept of team-based working, the following definition by West (2004, p.18) is provided;

*“Work teams are groups of people embedded in organisations, performing tasks that contribute to achieving the organisation’s goals. They share overall work objectives. They have the necessary authority, autonomy, and resources to achieve these objectives. Their work significantly affects others within the organisation. Team members are dependent on each other in the performance of their work to a significant extent; and they are recognised as a group by themselves and by others. They have to work closely, interdependently, and supportively to achieve the team’s goals. They have well-defined and unique roles. They are rarely more than 10 members in total...And they are recognised by others in the organisation as a team.”*

In defining competencies relating to teams, a number of researchers have distinguished between the terms ‘teamwork’ and ‘task work’ (McIntyre & Salas, 1998). The term ‘teamwork’ refers to *‘the dynamic, simultaneous and recursive enactment of process mechanisms which inhibit or contribute to team performance and performance outcomes’* (Salas, Stagl, Burke, & Goodwin, 2007, p.190). The collective nature of team tasks requires members to interact, collaborate and share resources to meet their objectives, meaning that they are dependent on one another for task accomplishment (Van der Vegt & Van de Vliert, 2002). Given that teamwork facilitates the achievement of collective goals and consequent team performance, teamwork is fundamental to the effectiveness of work teams (Cannon-bowers, Tannenbaum, Salas, & Volpe, 1995). Salas, Rosen, Burke and Goodwin (2009) refer to teamwork as the *process* for enacting team competencies. In contrast, ‘task work’ involves the operational activities that must be performed by team members to directly accomplish the task at hand, and is therefore related to the technical aspects that exist regardless of the design of work organisation (i.e. whether individuals work alone or as part of a team). Therefore ‘task work’ behaviours are specific to a given task and are therefore not generalisable to other tasks that the team might carry out (Rousseau, Aube, & Savoie, 2006). However, more recently team researchers have argued that although a dichotomy between teamwork and task work might be useful conceptually, in practice it is difficult to differentiate between task work and regulatory processes given that they are inter-related (Antoni & Hertel, 2009).

## 2.3 MODELS OF TEAMWORK, TEAM EFFECTIVENESS AND TEAM PERFORMANCE

Over the years, many of models of team effectiveness have been developed through the study of team processes and performance (e.g. Campion, Medsker, & Higgs, 1993; Gladstein, 1984; Hackman, 1987; Guzzo & Shea, 1992; Marks, Mathieu, & Zaccaro, 2001; Salas, Dickenson, Converse, & Tannenbaum, 1992; Salas, Sims, & Burke, 2005; Sundstrom, De Meuse, & Futrell, 1990; West 1996). In a recent review, Salas et al. (2007) identified 138 models and frameworks of team effectiveness and team performance, highlighting the substantial level of interest and scope in the area. Research into team effectiveness originally stemmed from classic systems theory and has generally been structured around an input-process-output model (IPO), a framework originally proposed by McGrath (1964) over forty years ago. Many researchers have adopted this model for organising team research (e.g. Barrick, Stewart, Neubert, & Mount, 1998; Cohen & Bailey, 1997; Hackman & Morris, 1975) with the general premise being that inputs affect outputs via the interaction that takes place during team processes. Thus interactions between team members (team processes) will influence input-output relationships (Hackman, 1986).

Inputs refer to antecedent factors (individual, team and organisational) that enable and constrain members' interactions. Examples of inputs include individual personalities, backgrounds and competencies, which together form the team's composition. Organisational level inputs include the cultural context, environment complexity and organisational design features which will all serve to affect the team's interactions with their external environment (Mathieu et al., 2008; West et al. 1998). One crucial team level input which should be emphasised is the structure of the team task, as it has often been suggested that task characteristics govern the extent to which a team can perform effectively (Steiner, 1972). A team task must be designed so that it requires a collective effort from all members of the team. The focus on the characteristics of the team task is also what ultimately distinguishes the more recent research on teams with an organisational psychology perspective from social psychological research. From a social psychological perspective, the task itself is not important – it is simply a means of facilitating social interaction. However, from an organisational perspective, the task is critical as it is the source of roles, collective goals, task-related exchanges and determines the coordination and workflow structure of the team (Kozlowski & Ilgen, 2006). From this perspective the social interaction inherent in teamwork is simply a beneficial by-product. According to the principles of the IPO model, team inputs

combine to drive team processes which are activities that team members engage in while trying to combine their resources to meet task demands (Kozlowski & Ilgen, 2006).

Processes define activities that teams engage in when combining resources to meet the demands of their task (Kozlowski & Ilgen, 2006). Team processes include for example communication, leadership, decision making, conflict, co-ordination, cohesiveness, group affective processes and unconscious processes (West et al., 1998). LePine, Piccolo, Jackson, Mathieu and Saul (2008) recently proposed three higher-order teamwork process dimensions on which narrowly defined team processes are underpinned. The authors propose that team processes can be defined as either transition processes, action processes or interpersonal processes. Transition processes refer to actions that teams execute between episodes of performance. These might include the formulation of objectives, strategies and plans (Lepine et al., 2008; Marks et al., 2001). Action processes describe the types of activities that a team engages in whilst working towards its objectives and goals (Marks et al., 2001, p.366). These include the monitoring of progress towards goals, the monitoring of systems such as resources, team monitoring and backup behaviours, and team coordination, to ensure that the actions of team members are synchronised and timely (Marks et al., 2001; Wittenbaum, Vaughan, & Stasser, 2002). Given the team processes are dynamic and evolve over time, some researchers also refer to construct measures of team processes as emergent states (Marks et al., 2001) or emergent phenomena (Kozlowski & Klein, 2000). Emergent states capture motivational, cognitive and affective properties of a team that unfold and change over time and context, rather than the nature of team member interactions. These include constructs such as potency, cohesion of collective efficacy.

Finally, outputs are results or by-products of a team which are valued by one or more constituencies (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Traditionally measured outputs relate to aspects of context-specific team performance (e.g. output quantity of a manufacturing team or the number of errors reported by a healthcare team). However, Hackman (1987) argued that such measures are often insufficient and inappropriate for addressing other relevant outcome dimensions which may reflect the social and interpersonal components of teamwork. As shall be discussed shortly, team effectiveness is commonly perceived as having at least two dimensions: team performance and team viability (Hackman, 1987; Sundstrom, DeMeuse, & Futrell, 1990). However, more recently, new forms and combinations of team outputs have appeared in the literature (Mathieu et al., 2008), including outcome measures of creativity, innovation and customer service. Indeed, the criteria used to define team effectiveness have become increasingly complex and ambiguous over the last

decade. Because performance tends to be context specific, and therefore varies between studies by virtue of teams being embedded in organisations, the main difficulties lie with the generalisability of one single measure or scale to all types of teams. Therefore, more research is needed to more clearly define team performance, ensuring that all outcomes measured are equally appropriate for the team at hand, as well as the wider organisation (Mathieu et al., 2008).

Overall, the IPO model is a heuristic, classic systems framework which has been helpful in organising and integrating theoretical and empirical research into team working (Hackman, 1986). However, it was initially designed for the purpose of organising small group literature circa 1964, and was not intended to be a theory or causal model of team effectiveness (Kozlowski & Ilgen, 2006). Indeed, many researchers have recently argued that the IPO model may no longer be sufficient for characterising teams (Moreland, 1996; Salas et al., 2007), as it fails to capture the emerging consensus that teams are complex, dynamic, systems which are inherently multilevel in nature (Ilgen et al., 2005; Klein & Kozlowski, 2000; Kozlowski & Ilgen, 2006). Therefore, despite serving as a valuable template for researchers over the years, the IPO model has been extended and modified into more sophisticated representations (cf. Cohen & Bailey, 1997; Hackman & Morris, 1975; Ilgen et al., 2005; Salas et al., 1992) such as the input-mediator-output-input (IMOI) framework (Ilgen et al., 2005). Ilgen et al. (2005) argue that many of the mediational factors which intervene in the relationship between inputs and outputs are not always team processes, but can also be emergent cognitive or affective states. Modifications of IPO models are also concerned with temporal dynamics and the context in which teams are embedded. For example, the IMOI model allows for feedback loops in the IPO sequence, acknowledging the cyclical and nonlinear linkages between inputs, mediators and outputs (Ilgen et al., 2005). Indeed, it is arguable that such a simple two dimensional IPO model is insufficient for capturing the true complexities of real-world teams working in demanding and multifaceted environments. However, the IPO model continues to provide team researchers with a useful framework for identifying the fundamental principles of effective teamwork (Guzzo & Shea, 1992). Indeed, Hackman's (1987) normative model of team effectiveness probably remains one of the most influential frameworks in the literature. Hackman proposes five over-riding factors which directly or indirectly influence team effectiveness;

- 1) Group design (e.g. group composition, group norms, task structure)
- 2) Organisational context (reward system, education system, information system)
- 3) Group synergy

- 4) Process criteria of effectiveness (e.g. level of task effort, availability of relevant knowledge, skills and abilities for task, appropriateness of performance strategies)
- 5) Material resources (availability of resources required for efficient task performance)

Hackman's model follows the IPO approach by proposing that input factors (group design and organisational context) are related to team processes (process criteria of effectiveness), which in turn impact on team effectiveness (with this relationship being moderated by the availability of material resources). Accordingly, team effectiveness has recently been defined as '*an evaluation of the outcomes of team performance processes relative to some set of criteria*' (Salas et al., 2009, p.41). The team literature has defined team effectiveness to include aspects of both productivity and satisfaction (e.g. Gladstein, 1984; Hackman, 1987; Sundstrom et al., 1990; Wall, Kemp, Jackson, & Clegg, 1986). Building on Hackman's (1987) original conceptualisation, Wageman, Hackman and Lehman (2005; p. 376) define team effectiveness using a three-dimensional conception;

- The productive output of a team (that is, its product, service or decision) meets or exceeds the quality, quantity and timeliness of expectations of the people who review, receive and/or use the output.
- The social processes used by the team to carry out the task and how they enhance the team members' capabilities to work together interdependently in future.
- The positive contribution of the group experience to the learning, growth and well-being of individual team members.

## 2.4 TEAMS IN CONTEXT

As was briefly discussed in the previous section, researchers have more recently sought to place the IPO model in a larger context, recognising that teams cannot be entirely understood independent of their context. In organisational research, system or level frameworks are ubiquitous and cannot be ignored. The idea that individuals are nested in teams, which are in turn nested in organisations, provides the hallmark of multilevel models (Klein & Kozlowski, 2000). The system contexts and the linkages between multiple levels (individual, team, and organisation) are key sources of contingencies and demands which require the team to align their processes. As a result, external factors related to the organisational context impact upon the team, imposing boundaries and constraints (Kozlowski & Bell, 2003).

Because teams do not operate in an organisational vacuum (Hackman, 2002), what is needed for team effectiveness is not only real teams, but a supportive organisational context that reinforces the team-based structure. Hackman (2002) proposed that the likelihood of team effectiveness is increased when a team has an enabling structure that facilitates rather than inhibits team working. He identified three critical organisational systems that support teamwork and ensure that real teams can also be effective teams. For a team to be well-supported, the organisation should provide an *educational system* that offers teams with the appropriate training and technical aids, an *information system* that supplies the necessary data for teams to plan their team objectives, and a *reward system* that allows for positive consequences for high team performance (Hackman, 2002). Team-based rewards have particularly important implications for the development of effective team working and have been shown to improve team performance (Tata & Prasad, 2004). Team-based organisations should therefore make a concerted effort to reward team members based on their collaborative efforts and collective performance. Such practices will help team members to recognise their goal interdependence, and work together cooperatively, helping and supporting each other wherever possible.

Developing effective teamwork in organisations also requires that there is a climate for team-based working. According to Schneider (1990), organisational climate can be defined as the behaviours, processes and practices that an organisation supports and rewards. Where an organisational climate exerts low autonomy, high control and lack of concern for employee welfare, teamwork is unlikely to be effective (West & Markiewicz, 2004). Because of their inherent diversity, teams work best in environments that provide the flexibility and freedom to explore the divergent perspectives of team members. High levels of bureaucracy and control will stifle such creativity and inhibit innovative problem solving. Therefore, organisations that actively encourage innovation and incorporate shared expectations of success in their values and culture may especially foster team effectiveness (Sundstrom, 1999). Further, research by Galagan (1986) indicates that organisations which are successful in implementing work teams tend to have similar cultures, often guided by top management philosophies such as paying attention to detail, superior quality or service, or support for innovation. Team-based working therefore needs to be supported throughout the entire organisational hierarchy.

## **2.5 THE EVIDENCE: TEAM WORKING AND OUTCOMES**

According to West and Markiewicz (2004) team-based working in organisations affords twelve primary benefits; efficient processes, flexible response to change, improved effectiveness, reduced costs, increased innovation, effective partnering, customer involvement, employee commitment and well-being and innovation and skill utilisation. Each of these benefits represents a potential output in the IPO model. Following a recent qualitative review of 31 survey-based studies by Delarue et al. (2008), research evidence has linked team-based working to a number of outcomes (operational, financial, structural, and worker), which will be briefly outlined here.

### **2.5.1 Team-based working and operational outcomes**

The contribution that team working can make to organisational effectiveness has been demonstrated in a range of studies. For example, Levine and D'Andrea-Tyson (1990) concluded that substantive participation leads to sustained increases in productivity, and that teams effectively enable such participation. Cohen, Ledford and Spreitzer (1996) also reported a significant impact on both efficiency and quality when a form of work organisation incorporated teams with strong employee involvement.

As previously discussed, reducing the number of layers in an organisation is a key characteristic of team-based organisations. In a study by Bacon and Blyton (2000), delayering of management, flexible job descriptions, and fewer pay bands and grades, all defined what the authors termed 'high-road' team working. Results from 157 members of teams from the UK iron and steel sector demonstrated that 'high-road' team working had a positive impact on both organisational performance and human resource outcomes. Similarly, in a review of twelve large-scale surveys and 185 case studies of managerial practices, Applebaum and Batt (1994) concluded that team-based working led to improvements in organisational performance in terms of both efficiency and quality. In a subsequent study, the researchers confirm the relationship between teamwork and improved quality (Batt & Applebaum, 1995).

A number of other survey-based studies have also reported links between team working and improvements in both labour productivity and quality (Banker, Fiefl, Schroeder, & Sinha, 1996; Batt, 1999; Batt, 2001; Benders & Van Hootegem, 1999; Elmuti, 1997; Mathieu, Gilson, & Ruddy, 2006; Paul & Anantharaman, 2003; Stewart & Barrick, 2000; Tata & Prasad, 2004). Positive effects of teamwork on productivity have also been recorded

in US steel mills (Boning, Ichniowski, & Shaw, 2001), the US apparel industry (Dunlop & Weil, 1996) and the Australian economy (Glassop, 2002).

However, other studies have found much weaker or even non-significant results between team working and productivity. For example, in a study of human capital investments and information technology on labour productivity, Black and Lynch (2001) found very little evidence for the positive effects of self-managed teams on productivity. Similarly, in their study on 36 steel production lines, Ichniowski, Shaw and Prensushi (1997) found that teamwork in isolation did not have a significant impact on performance, with positive effects only being found for bundles of HRM practices which included teamwork, incentive pay, employment security and training. Finally, Power and Waddell (2004) studied 200 Australian organisations and failed to find a relationship between self-managed work teams and performance.

### **2.5.2 Team-based working and financial outcomes**

Research evidence has found positive relationships between team working and financial outcomes. In a meta-analysis of 131 field studies on organisational change, Macy and Izumi (1993) found that interventions with the largest effects upon financial measures of organisational performance were team development interventions or the creation of autonomous work groups. Indeed, the relationship between autonomous (or semi-autonomous) work groups and financial outcomes was strongly significant. ( $r_{pbs} = .39$ ,  $p < .001$ ,  $n = 75$  studies; pp. 279, 294). Furthermore, in a study of German organisations, economic value added showed a significant increase after the introduction of shop floor participation, of which teamwork formed a significant part (Zwick, 2004). Similarly, Cooke (1994) reported that the introduction of teamwork had a significant effect on value added per employee. Finally, and more recently, a study conducted by Barrick, Bradley, Kristof-Brown and Colbert (2007) demonstrated that communication and cohesion among 94 credit union top-management teams was shown to positively impact on a firm's financial ratios.

However, other research has found no significant relationship between teamwork and financial outcomes. For example, Cappelli and Neumark (2001) found that 'high performance work practices', including teamwork, had no effect on overall labour efficiency, which was measured as the output per dollar spent on labour. Similarly, despite finding that Australian organisations with team structures benefited in terms of reduced employee turnover, higher productivity and a flatter management structure, Glassop's (2002) study of quality circles and

self-managing work groups found non-significant results regarding teamwork and profitability.

### **2.5.3 Team-based working and structural outcomes**

A small number of studies have reported on the effects that the introduction of teamwork can have on structural changes within an organisation. A key characteristic of team-based working is the decentralisation of decision making to lower levels in the organisation. Indeed, Bacon and Blyton (2000) noted that a decrease in layers of management was an important reason for the introduction of team working. As a result, organisations that use self-managing work groups have been shown to be less hierarchical in structure and demonstrate a broader span of control (Glassop, 2002). In another study, Tata and Prasad's (2004) findings demonstrate that a decentralised organisational structure leads to increased team effectiveness. A combination of team working and a flatter organisational structure has also been shown to further improve profitability (Zwick, 2004). Further, team-based work has been positively linked to establishment layoffs, which fell disproportionately upon managers (Osterman, 2000), demonstrating a move towards a flatter organisational structure.

### **2.5.4 Team-based working and individual outcomes**

With regards to the link between team-based working and individual-level outcomes, a number of studies have demonstrated that overall, the impact on employee behaviour (e.g. absenteeism, turnover) and employee attitudes (e.g. commitment, motivation) is largely favourable. In a survey of Canadian employees, Godard (2001) focused on attitudinal and behavioural outcomes and found that team-based working had statistically significant correlations with job satisfaction, empowerment, commitment, citizenship behaviour, task involvement and belongingness. A number of other studies have linked the job characteristics associated with self-managed teams with significant improvements in organisational commitment and job satisfaction (Batt, 2004; Batt & Appelbaum, 1995; Elmuti, 1997).

Furthermore, organisations with teams have been shown to have lower levels of employee turnover (Glassop, 2002). Reduced absenteeism has also been linked to the large-scale use of teams (Benders & Van Hootehem, 1999; Cohen, Ledford, & Spreitzer, 1996; Delarue, Van Hootehem, Huys, & Gryp, 2004), although this was not confirmed in Glassop's study (2002). Similarly, Harley (2001) found no significant differences in terms of stress, satisfaction and commitment between team members and non-team members. Some researchers have also argued that team-based working can intensify workload and control

(Barker, 1993). Despite this, the results for the relationship between individual-level outcomes and team-based working are generally positive.

## 2.6 THE ROMANCE OF TEAMS

So far, this chapter has presented promising evidence for the positive effects of team working in organisations. A review of the research evidence from the 1970's and 80's serves to underpin this optimism. Socio-technical systems theory (Cummings, 1978; Lewin, 1951; Trist, 1981) first advocated autonomous teamwork as the optimal work design for the enhancement of both organisational productivity and worker needs, with early empirical research largely supporting this position (e.g. Levine & Tyson, 1990; Pasmore, 1988; Pasmore, Francis, & Haldeman, 1982). Indeed, various meta-analyses of studies from the 1950's to the 1980's provided estimates of effect sizes which suggest a moderately strong positive effect of team working on organisational effectiveness (Beekun, 1989; Guzzo, Jette, & Katzell, 1985; Macy & Izumi, 1993). However, as is evident in the previous section, more recent research findings are not always clear and consistent. As a result, a number of debates focused on the imbalance between the popularity of teams in organisations and the evidence of their effectiveness have recently arisen in the literature (e.g. Glassop, 2002; Staw & Epstein, 2000). These include '*the romance of teams*' (Allen & Hecht, 2004), the '*tyranny of a team ideology*' (Sinclair, 1992), and the '*team halo effect*' (Naquin & Tynan, 2003), and generally argue that team-based working is simply a management fad which will disappear over time (cf. Abrahamson & Fairchild, 1999). However, the very fuel for these debates is the general inconsistency in our research findings on teams. I propose that this variation and lack of clarity in research findings is partly due to the poor precision in our measurement of 'teams' in the first place.

According to Lepine et al., (2008) a likely reason why findings from team research have not accumulated in an effective and coherent manner is that the concepts themselves are unclear or not sufficiently distinct from similar concepts. This may be especially true for the concept of a 'team' itself. When identifying and recruiting teams for study, team researchers seldom report and/or describe any inclusion criteria in relation to their subject of interest. Very rarely do researchers spell out any rigorous methodology for identifying teams to study. It seems that most researchers simply accept the presence of a 'team' label is sufficient evidence for ensuring that what they are studying is actually a team. Indeed, in their recent review on 31 studies of the effects of teamwork, Delarue et al. (2008) note that '*It is striking that only a minority of the studies give a clear, explicit definition of teamwork. A number of*

*authors only give a (sometimes rather vague or implicit) description of what they associate with a 'team'.*' (p.136). Later on they also note that *'most studies are satisfied with a yes/no response or a percentage of employees working in a team system'* (p.137). I propose that it is this lack of precision in measuring and actually studying what we define as a team that is contributing to the variation in our research findings. For example, imagine a study exploring the relationship between team potency and team performance. The only variables which are measured are the IV and DV and a few theoretically relevant control variables. Other, more fundamental, 'features' about the teams themselves are not explicitly measured in the analysis and are simply taken-for-granted. Should a team which has high levels of interdependence, clearly stipulated team objectives and a degree of autonomy over their work really be compared on an equal footing with a team which is by name only, and has none of the fundamental team features mentioned above? Then imagine that the findings of this study are compared in a meta-analysis to those of a similar study, again in which the researchers did not take accurate measurements of the features of the teams in their sample. Such scenarios might partly explain why our findings, so far appear inconsistent. I propose that without having a clear understanding about the fundamental features of the teams we are studying; it will be very difficult to achieve any further clarity in our research findings in future. We need to tighten up our definition and measurement of teams to ensure that we are not simply studying any group or collective which masquerades as a real team in an organisation. This thesis proposes a theoretical and practical means of achieving this clarity in future.

## **2.6 CONCLUSION**

The demanding and complex nature of today's organisations has compelled a movement towards team-based designs. As researchers, our understanding of teams, teamwork and team effectiveness is crucial, especially given the variation in our research findings and sceptical debates around the use of teams. Given the complexity of this challenge, a shared mental model of the science of teams is yet to be found (Salas et al. 2007). This provides an opportunity for new epistemological scope on conceptualising and measuring teams, an opportunity which lies at the very heart of this thesis.

## **Chapter 3: A study of team-based working in the National Health Service**

### **3.1 CHAPTER SUMMARY**

The aim of this chapter is to use secondary data from one of the world's largest organisations, the United Kingdom (UK) National Health Service (NHS) to examine the prevalence and nature of team-based working in this context, the characteristics that are important in teams, and the impact that different types of teams have on critical work-related safety outcomes. Using recent data from the National NHS Staff Survey, this study adopts a categorical approach for conceptualising and measuring real and pseudo team typologies. Results indicate that real teams have an important and significant impact on the reduction of many work-related safety outcomes, indicating that if team-based working is the chosen work design, then healthcare organisations should ensure that they are comprised of real teams, as opposed to pseudo team typologies. Methodological issues are also discussed, including the limitations of the current approach for measuring real teams in the National NHS Staff Survey.

### **3.2 TEAM-BASED WORKING IN UK HEALTHCARE**

Due to both the non-profit and public nature of the majority of healthcare organisations, team-based working in the healthcare domain requires special consideration. The context in which healthcare teams operate is characterised by particularly high levels of stress, complexity and workload, and the stakes for decision and action errors are high (Salas, Rosen, & King, 2007). Worrying evidence has shown that in British healthcare organisations there has been a 24% increase in the number of reported errors and incidents between 2002 and 2005 (National Audit Office, 2005). Bates, Boyle, Vander Vliet, Schneider, & Leape (1995) also found an average of 1.4 medication errors per patient during a hospital stay, with 0.9% of these errors leading to serious drug complications. However, previous research suggests that effective teamwork is associated with improved patient safety and reduced medical errors (e.g. Helmreich & Schafer, 1994; Heinemann & Zeiss, 2002). Team-based working is also associated with improved efficiency and reduced costs (West & Markiewicz, 2004); outcomes which would particularly benefit healthcare organisations battling with high demands and limited resources. Despite this evidence, not all healthcare organisations facilitate team-based working, and not all healthcare teams are effective. However, failure of healthcare professionals to work in effective teams can at the very least provide unsatisfying working conditions for staff, and, at worst can severely jeopardise patient safety. Indeed, West et al.

(2002) found that the greater percentage of staff working in teams predicted reduced levels of patient mortality. This chapter therefore seeks to present a clear case for the importance of real teams in healthcare organisations.

### **3.2.1 'Real' versus 'pseudo' teams**

Despite the various definitions in the literature, in reality we may have different entities in mind when we talk about teams (Hackman, 2002). Often people report that they are part of a team when they are merely working in close proximity to other people and have the same supervisor. However, as shall be explored, real teams are more than simply a collection of individuals co-acting with one another (Paris, Salas, & Cannon-Bowers, 2000; Hackman 2002). Following the definition presented in chapter 2 (West, 2004), recent research published by the Department of Health (Carter, West, Dawson, Richardson & Dunkley, 2008) proposes that a team is a 'real' team when team members work closely and interdependently towards clear, shared objectives. This conceptualisation and measurement of real teams focuses on the presence of three characteristics; clear team objectives, team interdependence and team reflexivity. Each of these will now be briefly discussed, with a more rigorous discussion being presented in chapter 4.

At the individual level, clear objectives can enhance performance by directing people's attention, efforts, and energies to promote learning in a persistent manner (Locke & Latham, 2002). The same is true of teams, whereby groups of people work together towards a common goal or purpose. Team objectives, which include a clearly defined purpose or mission statement, are thought to be critical to team effectiveness and performance (Gladstein, 1984; Guzzo & Shea, 1992; Hackman, 1987; Hackman & Walton, 1986; Sundstrom et al., 1990). Clear team level objectives give team members the incentive to combine their efforts and collaborate closely in their work together (Weldon & Weingart, 1993).

With regards to the second real team characteristic, the notion that various aspects of team interdependence, including collective tasks, goals, outcomes and rewards, are key determinants of team effectiveness is present in many lines of theory and research, including Socio-Technical Systems Theory (Trist, 1981) and IPO Models (Gladstein, 1984; Hackman, 1987). Within-team interdependence is widely considered as a fundamental characteristic of teams (Kozlowski & Bell, 2003) and tends to be the main reason why teams are formed in the first place (Mintzberg, 1979).

Finally, in relation to the third real team characteristic, West (1996) proposed that team reflexivity is an overarching factor which best predicts team effectiveness. By reflecting upon strategies, task objectives and processes, reflexive teams can plan ahead, actively structure situations, have a better knowledge of their work and anticipate errors (Carter & West, 1998; West, 1996, 2000, 2002). Reflexivity is particularly useful for teams working in complex task environments such as healthcare as it helps them to recognise whether the way in which they are currently working corresponds with emerging challenges and external conditions. Teams which are able to build self-awareness and monitor how members interact and work with one another are more likely to recognise areas that need attention and development, and implement improvement plans accordingly (Tjosvold, Tang & West, 2004).

In combination, these team characteristics have been used to distinguish a ‘real team’ from a ‘pseudo team’ (Carter et al., 2008; Dawson, Yan & West, 2007). In real teams, a shared understanding is facilitated by communication as team members work towards their interdependent goals. However, if a team fails to have a sufficient goal orientation, its members are likely to believe they work in a team but in reality still work as individuals. Thus, for the purposes of the current study, a team which does not have clear objectives, whose members do not communicate effectively together to reflect on performance, and/or do not work interdependently to achieve their objectives is termed a ‘pseudo team’. A pseudo team is therefore a loose group that takes a superficial team form. Working in pseudo teams which lack clear team objectives may pose a threat to the safety and psychological well-being of team members working in unsafe or hazardous environments. For instance, if team members put considerable individual effort into performing a task in circumstances where the whole team lacks goal agreement, communication, or goal focus, the experience of worse than expected performance could result in lowered motivation and satisfaction as Expectancy Valence Theory predicts, and research demonstrates (Arnold, 1981). Higher levels of work pressure and frustration could also result. Under such circumstances, team members are more likely to be vulnerable to work stressors, errors, accidents and aggression in the workplace. The unfortunate reality is that poor teams can put patients’ lives at risk (Mayor, 2002). As results from this chapter will demonstrate, it seems that pseudo team working, in which team-based working has not been implemented with thorough integration, is a characteristic of many of today’s healthcare organisations. The measurement approach to the real/pseudo team concept will be discussed in more detail in the methodology section. However, before this, a brief review of the evidence for the effectiveness of team-based working in healthcare will be provided.

### 3.2.2 The evidence: effects of team-based working in healthcare

In this section, I review the current research literature on the effects of team-based working in health care organisations, and identify the extent to which such interventions and initiatives have generated positive outcomes for both healthcare staff and patients. Firstly, a brief review of the history and prevalence of teamwork in healthcare organisations will be outlined.

The introduction of the National Cancer Act in 1971 in the USA triggered noteworthy changes to the structure of health organisations around the world, including the USA, Canada, Australia and Europe, in which workforces that deliver healthcare were organised largely into teams (Fleissig, Jenkins, Catt, & Fallowfield, 2006; Tattersall, 2006; Borrill, West, Shapiro, & Rees, 2000). Over recent years the importance of team working in healthcare has been emphasised in the UK government's vision for improved quality of care (Department of Health, 2000; 2008), and, along with leadership, was emphasised as being at the heart of Clinical Governance (Scully & Donaldson, 1998). In a recent report by Lord Darzi (2008), 'High Quality Care for All – NHS Next Stage Review' team-based working is described as an imperative:

*'Healthcare is delivered in a team. The team includes clinicians, managerial staff and those in supporting roles. All members of the team are valued. The sense of a shared endeavour – that all of us matter and stand together – was crucial in the inception of the NHS'. (p.59)*

It is well documented that poor team working can jeopardise patient safety (West et al., 2002). Conversely, successful teamwork is associated with innovative and effective healthcare delivery (West et al., 1998). The potential benefits of team working in primary care are three-fold: firstly, teamwork can increase task effectiveness (thus, improving patient health and satisfaction), secondly, team working can improve the well-being and morale of team members, and, thirdly, team viability is improved (Bower, Campbell, Bojke, & Sibbald, 2006). Research carried out by Borrill et al. (2000) looked closely at the effects of team working and effectiveness in the NHS and reached a number of conclusions. They found that innovative, high quality care was most likely to be provided by teams whose members were able to state clear and shared work objectives, emphasised quality, communicated well and held good quality meetings. These teams also tended to be composed of a diverse range of professional groups. So, what can effective team-based working in healthcare actually achieve?

Firstly, team-based working has been associated with lower patient mortality. West et al. (2002) carried out research on the relationship between human resource management (HRM) practices in hospitals and patient mortality and demonstrated a strong significant relationship between team working and mortality. On average, in hospitals where over 60% of staff reported working in formal teams, mortality was roughly 5% lower than would be expected. The study controlled for a variety of factors that might influence the results including the number of doctors per 100 beds, variations in local health profiles, hospitals and income. The study was also extended to control for mortality prior to the time when HRM practices were assessed, thus addressing the issue of reverse causality.

Team-based working has also been linked to reduced hospitalisation and costs. By comparing primary healthcare teams with physician care across 18 private practices in the U.S., Sommers, Marton, Barbaccia, and Randolph (2000) found that primary healthcare teams lowered hospitalisation rates and reduced physician visits while maintaining functions for elderly patients with chronic illness. The costs involved in setting up and maintaining the team were outweighed by the costs saved from reduced hospitalisation. Improved service provision has also been linked with team-based working in healthcare. Nurses in England reported that working together in primary health care teams reduced duplication of efforts, streamlined patient care and enabled specialist skills to be used more cost-effectively (Ross, Rink, & Furne, 2000). In analysing the records of general practitioners and district carers over six years in Sweden, Jansson, Isacson and Lindhom (1992) found that where teams were introduced, regions reported significant reductions in emergency visits, which was attributed to better accessibility and continuity of care in the teams. Similar results were reported by Jackson, Sullivan and Hodge (1993) who reviewed the effects on treatment and service rates twelve months after the introduction of community mental health teams in England.

Team working also contributes to performance in healthcare organisations by reducing errors and improving the quality of patient care (Firth-Cozens, 2001). The association between team working and these aspects of performance is recognised in a number of studies (Firth-Cozens, 1998; Adorian, Silverberg, Tomer, & Wamosher, 1990; Healthcare Commission, 2004). In addition, poor teamwork has been shown to affect staffing levels negatively, in that it is associated with early retirement (Luce et al., 2002) and increased sickness absence in doctors (Kivimaki et al., 2001). Enhanced patient care has also been linked to team-based working. Hughes et al. (1992) compared the provision of home care by teams with traditional hospital-based care for 171 terminally ill patients in a large U.S. Department of Veterans Affairs hospital. They found that patient and carer satisfaction

improved when homecare was delivered in teams. Both patients and caregivers of the team expressed significantly higher levels of satisfaction with continuous and comprehensive care, at one month and six months into the study. Furthermore, Sommers et al. (2000) reported an increase in satisfaction among patients who had access to a primary healthcare team as opposed to doctors alone. Amongst other outcomes, they reported fewer symptoms and improved overall health.

Finally, there is evidence to suggest that team-based working can predict staff well-being. Primary Care team working has been reported to improve staff motivation and satisfaction (Wood, Farrow, & Elliott, 1994). Members of effective teams report higher job satisfaction, role clarity and well-being (Mickan & Rodger, 2005). Referring back to the research by Borrill et al. (2000), their findings further suggest that effective teams are more highly motivated and suffer from lower levels of stress. Similar findings were also reported by Firth-Cozens and Moss (1998). Effective teamwork therefore provides a powerful means for reducing occupational stress. This is particularly important in the context of healthcare, where stress can affect the efficacy of treatment and care provided.

### **3.2.3 Study aims**

Given the potentially significant benefits that effective team-based working can have in the healthcare context for both the organisation and the individual, the study at hand aimed to examine the relationship between team-based working and a variety of safety-related work outcomes in the UK National Health Service (NHS). A brief description of the organisational context will now be outlined.

The NHS is a publicly funded healthcare system, offering predominantly free healthcare to all UK residents. The NHS comprises various types of Trust, including Primary Care Trusts, Ambulance Trusts and Mental Health Trusts. This study focused on Acute Trusts, also known as NHS Hospital Trusts. Acute Trusts provide secondary health services, which are predominantly delivered by medical specialists, such as cardiologists or physiotherapists. Their work is generally very interdependent in nature, and often requires staff to work in teams. An example of team working in NHS Acute Trusts is the work of a surgical team, whereby a surgeon, anaesthetists, nursing staff and technical staff all have to work together in a tightly co-coordinated, efficient manner. Together, they provide a continuum of care, from preoperative care, care during surgical procedures, to care during postoperative recovery. Although each team member has different roles and expertise, and

may be involved at different stages of the overall process, they are all working together towards a common goal – to ensure the delivery of high quality, effective healthcare for the service user. As highlighted in the recent Darzi report (2008), these outcomes should be a key priority for all staff working in NHS Acute Trusts. However, due to the highly complex and multi-faceted nature of their tasks, which have to be carried out in an environment characterized by high demands and limited resources (Sullivan, 1993), such outcomes can only be achieved through teamwork.

As discussed above, team-based working can have a variety of beneficial outcomes in the healthcare context. The focus of this study was on important outcomes related to safety at work. Such outcomes are key performance indicators in the healthcare domain, given the significant implications they can have for both staff and patients. As was discussed at length in chapter 2, previous research has shown that team working can have a significant impact on both efficiency and quality (Cohen, Ledford, & Spreitzer, 1996). For example, positive effects of team-based working on productivity have been recorded in a range of organizational contexts including US steel mills (Boning, Ichniowski, & Shaw, 2001), the US apparel industry (Dunlop & Weil, 1996) and the Australian economy (Glassop, 2002). The following hypothesis was therefore developed for investigation.

*Hypothesis 3.1:* Real team-based working will be positively associated with performance.

Team-based working has also been shown to be linked to individual outcomes including well-being. For example, organisations with teams have been shown to have lower levels of employee turnover (Glassop, 2002), reduced absenteeism (Benders & Van Hootegeem, 1999; Cohen, Ledford, & Spreitzer, 1996; Delarue, Van Hootegeem, Huys, & Gryp, 2004) as well as organisational commitment and job satisfaction (Batt, 2004; Batt & Appelbaum, 1995; Elmuti, 1997; Godard, 2001). Previous research has also found evidence that well-structured teams experience lower levels of stress (Carter & West, 1999). These differences were accounted for by the higher levels of role clarity and social support experienced by those working in well-structured teams (Carter & West, 1999). The following hypothesis was therefore developed for investigation.

*Hypothesis 3.2:* Real team-based working will be positively associated with individual well-being.

## 3.3 METHODOLOGY

### 3.3.1 Sample

The present study used part of the large scale National NHS Staff Survey data gathered in the UK in 2006, in which all Acute hospitals in England took part. Questionnaires were distributed to a randomly sample of eligible staff within each organisation. Eligible staff were those employed in Acute hospitals, and had been officially appointed since September 2006. The sample size was dependent on the number of staff working in a given hospital; hospitals with over 3,000 staff were required to sample 850 employees, whereas hospitals with less than 600 staff were required to conduct a full census. Data was collected between October and December 2006. Six independent survey companies were responsible for distributing, collecting, and entering original data, after which it was transferred to Aston University for collation, checking and analysis. Overall, 62,591 respondents from the 151 non-specialist Acute Trusts took part.

### 3.3.2 Measures

#### 3.3.2.1 *Team-based working*

Respondents were presented with four questions relevant to team working. Firstly they were asked whether they worked in a team. Those who indicated 'no' were classified as not working in a team (8.7% of respondents). Those who indicated 'yes' were assigned to two further sub-groups, derived from their responses to three further questions based on the current criteria for a real team. These questions asked:

- a) Whether the team they worked in had clear objectives (*clear team objectives*)
- b) Whether they had to work closely with other team members to achieve the team's objectives (*interdependence*)
- c) Whether the team met regularly to discuss its effectiveness and how it could be improved (*reflexivity*).

Respondents answered using a binary yes/no response. If respondents answered 'Yes' to all of the questions above, they were classified as working in a 'real team' (50.4% of respondents). If they answered 'No' to any of the questions, then they were initially classified as working in a 'pseudo' team (37.4% of respondents). Further analysis of the 'pseudo team' group was carried out in order to split them into three different categories, depending on how the respondent answered the questions above.

- -1 pseudo teams; missing any one of the real team criteria
- -2 pseudo teams; missing any two of the real team criteria
- -3 pseudo teams; missing all three of the real team criteria

In order to explore which of the real team criteria were most important for the prediction of safety at work outcomes, the responses to the team working questions were then further re-calculated into seven unique categories. The assigned category depended on whether respondents were working in a pseudo team which was;

- missing all three of the criteria: ‘No’ to questions a, b and c above  
(3.7% of respondents)
- missing two of the criteria: ‘Yes’ to question a only (‘No’ to questions b and c)  
(2.5 % of respondents)
- missing two of the criteria: ‘Yes’ to question b only (‘No’ to questions a and c)  
(4.4 % of respondents)
- missing two of the criteria: ‘Yes’ to question c only (‘No’ to questions a and b)  
(1.1 % of respondents)
- missing one of the criteria: ‘Yes’ to questions a and b (‘No’ to question c only)  
(21 % of respondents)
- missing one of the criteria: ‘Yes’ to questions a and c (‘No’ to question b only)  
(2.4 % of respondents)
- missing one of the criteria: ‘Yes’ to question b and c (‘No’ to question a only)  
(2.4 % of respondents)

### **3.3.2.2 Performance**

Indicators of performance were operationalised in the National NHS Staff Survey using measures of work-related safety outcomes. These included experienced harassment, bullying or abuse from patients and work colleagues, experienced physical violence from patients and work colleagues and witnessing errors, near misses or incidents. The lower the levels of these work-related safety measures, the higher the performance outcomes. These five indicators of performance each consisted of a single item measure using a dichotomous response of yes/no, and are outlined in more detail below.

***Experienced harassment, bullying or abuse from patient.*** Respondents were asked ‘*In the last 12 months have you experienced harassment, bullying or abuse from any of the following: a) patients / service users, b) relatives of patients / service users*’. A respondent was considered to have experienced harassment, bullying or abuse from patients if they had answered ‘Yes’ to either of these questions.

***Experienced harassment, bullying or abuse from work colleagues.*** Respondents were asked ‘*In the last 12 months have you experienced harassment, bullying or abuse from any of the following: c) manager / team leader, d) colleagues*’. A respondent was considered to have experienced harassment, bullying or abuse from work colleagues if they had answered ‘Yes’ to either of these questions.

***Experienced physical violence from patients.*** Respondents were asked ‘*In the last 12 months have you experienced physical violence from any of the following: a) patients / service users, b) relatives of patients / service users*’. A respondent was considered to have experienced physical violence from patients if they had answered ‘Yes’ to either of these questions.

***Experienced physical violence from work colleagues.*** Respondents were asked ‘*In the last 12 months have you experienced physical violence from any of the following: c) manager / team leader, d) colleagues*’. A respondent was considered to have experienced physical violence from work colleagues if they had answered ‘Yes’ to either of these questions.

***Witnessed errors, near misses or incidents.*** Respondents were asked ‘*In the last 12 months, have you seen errors, near misses, or incidents that could have hurt: a) patients or b) staff*’. A respondent was considered to have witnessed errors, near misses or incidents if they had answered ‘Yes’ to either of these questions.

### ***3.3.2.3 Individual well-being***

Indicators of individual well-being were operationalised in the National NHS Staff Survey using measures of work-related stress and work-related injuries. These two indicators of individual well-being each consisted of a single item measure using a dichotomous response of yes/no, and are outlined in more detail below.

**Work-related stress.** Respondents were asked ‘*During the last 12 months have you been injured or felt unwell as a result of the following problems at work: e) work-related stress*’. A respondent was considered to have experienced work-related stress if they had answered ‘Yes’ to this question.

**Work-related injuries.** Respondents were asked ‘*During the last 12 months have you been injured or felt unwell as a result of the following problems at work: a) moving and handling, b) needlestick and sharps injuries, c) slips, trips or falls, and/or d) exposure to dangerous substances*’. A respondent was considered to have experienced work-related injuries if they had answered ‘Yes’ to any of these questions.

### **3.3.3 Preliminary Data Analysis**

Data was entered into SPSS 16 for inferential statistical analysis. Preliminary data analysis was carried out in order to explore whether any socio-demographic and other work-related characteristics, which were also collected as part of the NHS staff survey, had any significant influence on the independent variable of team-based working, and the dependent variables measuring aspects of safety at work. As the following section explores, a number of possible control variables were explored in preliminary data analysis. All tables relating to this preliminary analysis can be found in Appendix A (tables A.1 to A.7).

#### **3.3.3.1 Age**

There were significant differences between age category and whether respondents worked in a real team, with younger staff being more likely to report that they work in a real team (see Appendix A, table A.1). There were also significant differences between age category and all of the dependent variables. Again, younger staff were typically more likely to have experienced work-related injuries, to have witnessed errors, and to have experienced harassment, bullying or abuse from patients, and violence from colleagues. However, they were less likely to have suffered work-related stress or have experienced violence from patients.

#### **3.3.3.2 Gender**

There were significant differences between gender and whether respondents worked in a real team, as well as with most of the dependent variables, other than harassment, bullying or abuse from colleagues (see Appendix A, table A.2). Males were not only more likely to report

working in a real team, they were less likely to suffer from work related injuries and stress, witness errors, and experience harassment and violence from patients. However, they were more likely to experience violence from work colleagues.

#### ***3.3.3.3 Ethnic background***

With regards to ethnic background, there were no significant differences between White or Black and Minority Ethnic (BME) staffs' experiences of violence from patients or witnessing of errors (see Appendix A, table A.3). However, BME staff were more likely to report suffering from work related stress and injuries, as well as experience harassment from patients and work colleagues. Conversely, white staff were more likely to experience harassment and bullying from patients and were less likely to work in real teams.

#### ***3.3.3.4 Organisational tenure***

Preliminary analysis showed that there were significant differences in whether respondents worked in a 'real team' across all of the dependent variables according to the length of time they had worked for their NHS Trust (see Appendix A, table A.3). Respondents who reported working in real teams were typically those who had recently joined their Trust, followed by those who had been working for the Trust for over 15 years. This could be explained by the possibility that new staff are more conscientious in ensuring that they are working in an effective and collaborative manner in their new work environment. Further staff who had been with the Trust for over 15 years are more likely to be in a management role which is likely to require them to monitor and manage teams effectively. Further, given their organisational tenure, it is likely that such staff will have worked in many different teams and will therefore have experience of both well-functioning and poor-functioning teams. In terms of performance and individual well-being outcomes, those who had recently joined their Trust were also less likely to suffer from work-related stress, or to have experienced violence and harassment from patients and colleagues. However, those who had worked for the Trust the longest were the least likely to suffer work-related injuries, again perhaps due to their work experience and familiarity with clinical practice and procedures.

#### ***3.3.3.5 Occupational group***

Preliminary analysis showed that there were significant differences between occupational group to which the respondent belonged to and whether they worked in a real team (see Appendix A, table A.4). Occupational groups which were typically most likely to work in real teams included front line staff such as nurses and allied health professionals. Conversely,

those least likely to report working in a real team were those in general management roles as well as central functions, ancillary and ambulance staff. Of all the occupational groups, nursing staff were typically most likely to have suffered from work-related stress and injury, to have witnessed errors, and to have experienced harassment, bullying, abuse and physical violence from both patients and work colleagues. Occupational groups which were typically least likely to experience health and safety problems were those in general management roles, those working in central functions and ambulance staff.

#### ***3.3.3.6 Trust region***

Preliminary analysis indicated that there were significant differences on whether respondents worked in a real team across all of the regions, as well as significant differences between Trust region and all of the dependent variables (see Appendix A, table A.5). Respondents working in the London region were most likely to work in a real team, closely followed by respondents working in the North East. Those least likely to work in a real team were working in the East Midlands and South Central regions. Conversely, despite reporting the highest levels of real team working, respondents working in the London region also reported the worst performance and well-being outcomes, particularly on harassment and physical violence from work colleagues. In a similar fashion, respondents working in the East Midlands region reported the lowest levels across all of the outcomes.

#### ***3.3.3.7 Line management responsibility***

Respondents who were line managers were typically more likely to work in a real team than respondents who were non-line managers (see Appendix A, table A.6). Further, however, line managers were more likely to suffer from work related stress and injuries, witness errors and incidents, and experience harassment and physical violence from patients and work colleagues.

#### ***3.3.3.8 Disability status***

Preliminary analysis also showed significant differences between disability status and whether a respondent worked in a real team, as well as significant differences between disability status and all of the dependent variables (see Appendix A, table 6). Non-disabled respondents were typically more likely to report working in a real team. Conversely, respondents who reported that they suffered from a long standing illness or disability also typically reported significantly more work related injuries, suffering of work related stress, witnessing of errors

and incidents, and experiences of harassment and physical violence from patients and work colleagues, than respondents who reported that they were not disabled.

### **3.3.3.9 Work pattern**

Respondents were asked whether they worked full-time or part-time and whether or not they worked shifts as part of their job. There were significant differences between contracted hours (full time or part time) and whether respondents worked in a ‘real team’, along with all of the safety-related work outcomes (see Appendix 3.1, table 6). Part time staff were far less likely to report working in a ‘real team’, yet also reported significantly lower levels of all of the dependent variables.

Overall the preliminary analysis highlighted the potential impact that a variety of socio-demographic and work-related characteristics have on the variables of interest in this study. All of the variables discussed in this section were therefore incorporated as control measures for the main data analysis. In an effort to reduce the effects of single-source common method variance, a measure of organisational climate was also included as a control variable. To measure organisational climate, respondents answered six questions relating to quality of care in their organisation, staff involvement, communication and innovation. Respondents answered using a 5-point likert scale (*1 = strongly disagree, 5 = strongly agree*), an example item being ‘*Managers encourage staff to suggest new ideas for improving services*’ ( $\alpha = 0.86$ ).

### **3.3.4 Main data analysis**

Due to the categorical nature of the dependent variables, data was treated with a series of binary logistic regressions in order to predict the performance and well-being outcomes. As discussed, organisational climate was included as a covariant in the regression to reduce the effects of common-method variance. The socio-demographic variables tested during preliminary analysis were also controlled for. Independent variables tested included all of the typologies of team working discussed in section 3.3.2.1. Therefore, for each dependent variable, six binary logistic regressions were performed. The first two regressions each used a different comparator group (‘real team’ and ‘no team’) to test the 3-team typology measure of team-based working (three comparison groups; no team, pseudo team, and real team). Similarly, the second two regressions each used a different comparator group (‘real team’ and ‘no team’) to test the 5-team typology measure (five comparison groups; ‘no team’, ‘missing 3’, ‘missing 2’, ‘missing 1’, and ‘real team’). And finally, the third two regressions each used

a different comparator group ('real team' and 'no team') to test the 9-team typology measure (nine comparison groups; 'no team', 'missing abc', 'missing bc', 'missing ac', 'missing ab', 'missing c', 'missing b', 'missing a', and 'real team').

Binary logistic regressions allowed for the assessment of the degree of difference between two comparator groups ('real team' and 'no team') by calculating the odds ratios (ORs) for each. Due to the large sample size, two criteria were used when interpreting the odds ratios: firstly whether the odds ratios were significant to conventional levels ( $p < 0.05$ ) and secondly an assessment of the size of the odds ratio. An odds ratio of 1 would indicate that there was no difference between the two comparison groups, while an odds ratio of less than 1 would mean that respondents in the comparison groups (i.e. types of pseudo team) were less likely to have experienced the safety related work outcome at hand. Conversely an odds ratio of more than 1 would mean that respondents in the comparison group (i.e. types of pseudo team) were more likely to have experienced the safety related work outcome at hand. Due to the large sample size, even relatively small relationships could have been displayed as being significant. Therefore it was important to filter out any small effect sizes. Consequently, when interpreting the relationships, a conservative estimate of an odds ratio was used. An odds ratio was considered as being meaningful if it was less than 0.7 (to represent it being 'less likely') and above 1.3 (to represent it being 'more likely'). These cut-offs were calculated by converting each odds ratio into a Cohen effect size using the formula  $d = \ln(\text{OR})/1.81$  (Chinn, 2000). Using this formula, the OR of 1.3 becomes a Cohen's  $d$  of 0.15, and the OR 0.7 becomes a Cohen's  $d$  of 0.20; both of which are only slightly smaller than Cohen's small effect size of  $d = 0.2$ . This approach prevents the effect sizes being studied from including many of those with negligible practical importance. See tables 3.1 to 3.3 for the results of the binary logistic regressions. The results for the two hypotheses will now be discussed in turn.

## 3.4 RESULTS

### 3.4.1 Team-based working and performance

Hypothesis 3.1 stated that real team-based working will be positively associated to performance. As this study was based in the NHS healthcare context, high performance can be equated with lower levels of harassment, bullying or abuse from patients and work colleagues, lower levels of physical violence from patients and work colleagues and lower levels of witnessed errors, near misses or incidents. Results relating to each of these specific performance indicators will now be discussed in turn.

#### ***3.4.1.1 Harassment, bullying or abuse from patients and work colleagues***

Real team-based working was negatively associated with experienced harassment, bullying or abuse from patients and work colleagues. As table 3.1 shows, for staff working in Acute NHS Trusts, the odds ratio for experiencing harassment, bullying or abuse from patients was significantly higher for respondents who reported working in pseudo teams than for those working in real teams or not working in teams at all, although these effects are notably quite weak (OR, 1.08, 1.25 respectively) and do not fall within the limits outlined in section 3.3.4. However, stronger relationships were found for harassment, bullying or abuse from work colleagues', with notably stronger relationships (OR, 1.52, 1.40 respectively).

**Table 3.1: Team-based working and work-related safety - binary logistic regression (3-team typology)**

	Suffered work-related injuries		Suffered work-related stress		Witnessed errors and incidents		Experienced physical violence from				Experienced harassment, bullying or abuse from			
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Patients		Work colleagues		Patients		Work colleagues	
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.
<b>Real team</b>														
no team	0.96	0.29	1.04	0.23	0.88	$p < 0.001$	0.71	$p < 0.001$	0.77	0.14	0.86	$p < 0.001$	1.08	0.07
pseudo team	1.38	$p < 0.001$	1.33	$p < 0.001$	1.06	0.01	1.15	$p < 0.001$	1.36	$p < 0.001$	1.08	$p < 0.001$	1.52	$p < 0.001$
<b>No team</b>														
pseudo team	1.45	$p < 0.001$	1.27	$p < 0.001$	1.20	$p < 0.001$	1.61	$p < 0.001$	1.77	$p < 0.001$	1.25	$p < 0.001$	1.40	$p < 0.001$
real team	1.05	0.29	0.96	0.23	1.14	$p < 0.001$	1.40	$p < 0.001$	1.30	0.14	1.16	$p < 0.001$	0.92	0.07

Note: Exp(B) represents the ‘odds ratio’ where a higher score indicates respondents in this group are more likely to have experienced the safety related work outcome when compared with a comparator group - in the first set of rows the comparator group was ‘working in a real team’, and in the second set of rows the comparator group was ‘not working in a team’.

**Table 3.2: Team-based working and work-related safety - binary logistic regression (5-team typology)**

	Suffered work-related injuries		Suffered work-related stress		Witnessed errors and incidents		Experienced physical violence from				Experienced harassment, bullying or abuse from			
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Patients		Work colleagues		Patients		Work colleagues	
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.
<b>Real team</b>														
no team	0.96	0.29	1.05	0.20	0.88	$p < 0.001$	0.71	$p < 0.001$	0.79	0.17	0.86	$p < 0.001$	1.09	0.05
missing 3	1.37	$p < 0.001$	1.48	$p < 0.001$	1.12	0.01	1.15	0.04	2.17	$p < 0.001$	1.05	0.38	2.05	$p < 0.001$
missing 2	1.44	$p < 0.001$	1.55	$p < 0.001$	1.16	$p < 0.001$	1.13	0.02	1.90	$p < 0.001$	1.10	0.01	1.93	$p < 0.001$
missing 1	1.37	$p < 0.001$	1.24	$p < 0.001$	1.02	0.38	1.15	$p < 0.001$	1.08	0.53	1.08	$p < 0.001$	1.34	$p < 0.001$
<b>No team</b>														
missing 3	1.44	$p < 0.001$	1.41	$p < 0.001$	1.28	$p < 0.001$	1.61	$p < 0.001$	2.76	$p < 0.001$	1.21	$p < 0.001$	1.88	$p < 0.001$
missing 2	1.50	$p < 0.001$	1.49	$p < 0.001$	1.32	$p < 0.001$	1.58	$p < 0.001$	2.42	$p < 0.001$	1.27	$p < 0.001$	1.77	$p < 0.001$
missing 1	1.43	$p < 0.001$	1.19	$p < 0.001$	1.16	$p < 0.001$	1.17	$p < 0.001$	1.36	0.09	1.25	$p < 0.001$	1.23	$p < 0.001$
real team	1.04	0.29	0.96	0.20	1.14	$p < 0.001$	1.40	$p < 0.001$	1.27	0.17	1.16	$p < 0.001$	0.92	0.05

Note: Exp(B) represents the ‘odds ratio’ where a higher score indicates respondents in this group are more likely to have experienced the safety related work outcome when compared with a comparator group - in the first set of rows the comparator group was ‘working in a real team’, and in the second set of rows the comparator group was ‘not working in a team’.

**Table 3.3: Team-based working and work-related safety - binary logistic regression (9-team typology)**

	Suffered work-related injuries		Suffered work-related stress		Witnessed errors and incidents		Experienced physical violence from				Experienced harassment, bullying or abuse from			
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Patients		Work colleagues		Patients		Work colleagues	
	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)	Sig.
<b>Real team</b>														
missing a, b, c	1.38	<i>p</i> <0.001	1.48	<i>p</i> <0.001	1.13	0.01	1.15	0.03	2.18	<i>p</i> <0.001	1.05	0.33	2.06	<i>p</i> <0.001
missing b, c	1.24	<i>p</i> <0.001	1.26	<i>p</i> <0.001	0.86	0.01	1.07	0.51	1.57	0.04	0.96	0.54	1.36	<i>p</i> <0.001
missing a, c	1.65	<i>p</i> <0.001	1.80	<i>p</i> <0.001	1.43	<i>p</i> <0.001	1.20	<i>p</i> <0.001	2.12	<i>p</i> <0.001	1.20	<i>p</i> <0.001	2.35	<i>p</i> <0.001
missing a, b	1.04	0.73	1.32	<i>p</i> <0.001	0.95	0.54	0.94	0.64	1.48	0.26	0.97	0.78	1.58	<i>p</i> <0.001
missing c	1.44	<i>p</i> <0.001	1.23	<i>p</i> <0.001	1.01	0.78	1.18	<i>p</i> <0.001	1.00	0.97	1.11	<i>p</i> <0.001	1.30	<i>p</i> <0.001
missing b	0.91	0.22	1.05	0.40	0.85	0.01	0.95	0.66	0.89	0.71	0.79	<i>p</i> <0.001	1.11	0.19
missing a	1.18	0.02	1.63	<i>p</i> <0.001	1.35	<i>p</i> <0.001	1.04	0.66	0.92	<i>p</i> <0.001	1.05	0.43	1.94	<i>p</i> <0.001
<b>No team</b>														
missing a, b, c	1.44	<i>p</i> <0.001	1.42	<i>p</i> <0.001	1.28	<i>p</i> <0.001	1.61	<i>p</i> <0.001	2.79	<i>p</i> <0.001	1.21	<i>p</i> <0.001	1.90	<i>p</i> <0.001
missing b, c	1.29	<i>p</i> <0.001	1.21	<i>p</i> <0.001	0.97	0.71	1.50	<i>p</i> <0.001	2.01	0.01	1.11	0.17	1.26	<i>p</i> <0.001
missing a, c	1.73	<i>p</i> <0.001	1.73	<i>p</i> <0.001	1.63	<i>p</i> <0.001	1.68	<i>p</i> <0.001	2.71	<i>p</i> <0.001	1.39	<i>p</i> <0.001	2.16	<i>p</i> <0.001
missing a, b	1.08	0.48	1.26	0.01	1.08	0.39	1.31	0.07	1.90	0.09	1.13	0.24	1.46	<i>p</i> <0.001
missing c	1.51	<i>p</i> <0.001	1.18	<i>p</i> <0.001	1.15	<i>p</i> <0.001	1.66	<i>p</i> <0.001	1.28	0.18	1.29	<i>p</i> <0.001	1.19	<i>p</i> <0.001
missing b	0.95	0.53	1.01	0.88	0.97	0.62	1.34	0.02	1.13	0.73	0.92	0.27	1.02	0.81
missing a	1.24	0.01	1.57	<i>p</i> <0.001	1.54	<i>p</i> <0.001	1.46	<i>p</i> <0.001	2.46	<i>p</i> <0.001	1.22	0.01	1.79	<i>p</i> <0.001

Note: Exp(B) represents the ‘odds ratio’ where a higher score indicates respondents in this group are more likely to have experienced the safety related work outcome when compared with a comparator group - in the first set of rows the comparator group was ‘working in a real team’, and in the second set of rows the comparator group was ‘not working in a team.’

Looking more closely at the three types of pseudo teams, table 3.2 indicates that for staff working in Acute NHS Trusts, the odds ratio for having experienced harassment, bullying or abuse from patients was significantly higher for respondents working in pseudo teams which were a) missing any two of the real team criteria, or b) missing any one of the real team criteria, than for those respondents working in real teams (OR, 1.10, 1.08 respectively), although again these relationships were very weak given the sample size. Furthermore, table 3.2 also shows that the odds ratio for having experienced harassment, bullying or abuse from patients was also significantly higher for each type of pseudo team when compared to respondents who did not report working in a team at all (OR, 1.21, 1.27, 1.25 respectively), although again these relationships were quite weak.

With regards to harassment, bullying or abuse from work colleagues, respondents working in all three types of pseudo teams were significantly more likely to experience such outcomes compared to respondents working in real teams (OR, 2.05, 1.93, 1.34 respectively). Furthermore, table 3.2 also shows that the odds ratio for having experienced harassment, bullying or abuse from work colleagues was significantly higher for each type of pseudo team when compared to respondents who did not report working in a team at all (OR, 1.88, 1.77, 1.23 respectively).

As previously discussed, for the purposes of this first study, a real team was considered as one which meet three specific criteria; a) the team has clear objectives, b) team members work closely to achieve the team's objectives, and c) the team meets regularly and reflects upon its tasks and objectives. The third set of regressions allowed me to take a closer look at which of these real team criteria were most important for predicting the safety related work outcome at hand. As table 3.3 shows, compared to those working in real teams, experiences of harassment, bullying or abuse from patients was highest when respondents reported working in a team in which members do work together closely and interdependently, but the team does not have clear objectives, nor does it meet regularly to reflect upon its tasks and objectives (missing a and c; OR, 1.20). Among pseudo teams missing just one of the real team criteria, the odds ratio for experiences of harassment, bullying or abuse from patients was highest for teams which do not meet regularly to reflect upon tasks and objectives (missing c only, OR, 1.11). Conversely, teams which do have clear objectives and do meet regularly to reflect upon tasks and objectives, but whose members do not work closely and interdependently were actually less likely to report experiencing harassment bullying or abuse from patients compared to those working in real teams (missing b only, OR, 0.79). However,

it should be noted that none of these relationships were particularly strong, given the sample size.

With regards to experiences of harassment, bullying or abuse from work colleagues, experiences were again highest for respondents working in teams in which members do work together closely and interdependently, but the team does not have clear objectives, nor does it meet regularly to reflect upon its tasks and objectives (missing a and c; OR, 2.35). Among pseudo teams missing just one of the real team criteria, the odds ratio for experiences of harassment, bullying or abuse from colleagues was highest for teams which do not work closely and interdependently (missing b only; OR, 1.94). Both of these relationships were significant and strong in terms of their effect size.

#### ***3.4.1.2 Experienced physical violence from patients and work colleagues***

Real team-based working was negatively associated with experienced physical violence from patients and work colleagues. As table 3.1 shows, for staff working in Acute NHS Trusts, the odds ratio for experiencing physical violence from patients was significantly higher for respondents who reported working in pseudo teams than for those working in real teams or not working in teams at all (OR, 1.15, 1.61 respectively). The same was true for physical violence from work colleagues (OR, 1.36, 1.77 respectively).

Furthermore, table 3.2 indicates that the odds ratio for having experienced physical violence from patients was significantly higher for respondents working in pseudo teams which were a) missing all three of the real team criteria, b) missing any two of the real team criteria or c) missing any one of the real team criteria, than for those respondents working in real teams (OR, 1.15, 1.13, 1.15 respectively). Table 3.2 also shows that the odds ratio for having experienced violence from patients was also significantly higher for each type of pseudo team when compared to respondents who did not report working in a team at all (OR, 1.61, 1.58, 1.17 respectively). With regards to the experience of physical violence from work colleagues, such experiences were highest for respondents working in teams which were missing all three of the real team criteria (OR, 2.17). However, if a pseudo team was missing just one of the real team criteria, the level of physical violence from work colleagues was comparable to that of respondents who worked in a real team (OR, 1.08).

Results from the third set of regressions indicate which particular aspect of real team working was most important in predicting violence in the workplace. Table 3.3 shows that experiences of physical violence from patients was highest for those respondents who worked

in teams in which members do work together closely and interdependently (b), but the team does not have clear objectives, nor does the team meet regularly to reflect upon tasks and objectives (missing a and c; OR, 1.20). Among pseudo teams missing just one of the real team criteria, the odds ratio for experiencing physical violence from patients was highest for teams which do not meet regularly to reflect upon tasks and objectives (missing c only; OR, 1.18), although this relationship was not particularly strong in terms of effect size.

As table 3.3 shows, compared with a real team, experienced physical violence from work colleagues was highest where pseudo teams did not display any of the criteria of a real team (missing a, b and c; OR, 2.18). Among pseudo teams missing just one of the real team criteria, the odds ratio for experiencing physical violence from work colleagues was highest for teams which do not meet regularly to reflect upon its tasks and objectives (missing c only, OR, 1.00), although this is around a similar level to that reported by members of real teams.

#### ***3.4.1.3 Witnessed errors, near misses or incidents***

Finally, in terms of healthcare performance indicators, real team-based working was also negatively associated with witnessed errors, near misses or incidents. Table 3.1 shows that, for staff working in Acute NHS Trusts, the odds ratio for witnessing errors, near misses or incidents was significantly higher for respondents who reported working in pseudo teams than for those working in real teams or not working in teams at all (OR, 1.06, 1.20 respectively). Furthermore, table 3.2 indicates that the odds ratio for witnessing errors, near misses or incidents was significantly higher for respondents working in pseudo teams which were a) missing any two of the real team criteria or b) missing any one of the real team criteria, than for those respondents working in real teams (OR, 1.16, 1.12 respectively), although these effect sizes were small.

In terms of which aspects of real team working were most important in predicting this outcome, results indicated that the witnessing errors, near misses or incidents was highest for those respondents who worked in teams in which members do work together closely and interdependently, but the team does not have clear objectives, nor does the team meet regularly to reflect upon its tasks and objectives (missing a and c; OR, 1.43). Furthermore, among pseudo teams missing just one of the real team criteria, the odds ratio for witnessing errors, near misses or incidents was highest for teams which do not have clear objectives (missing a only; OR, 1.35).

#### **3.4.1.4 Summary**

Overall, the general consistency in the results from the five outcome measures of performance discussed above suggest that hypothesis 3.1 can be accepted. Real team-based working was significantly negatively associated with experienced harassment, bullying or abuse from patients and work colleagues, experienced physical violence from patients and work colleagues, as well as witnessed errors and incidents. An interpretation of these results is provided in the discussion (see section 3.5).

#### **3.4.2 Team-based working and individual well-being**

Hypothesis 3.2 stated that real team-based working will be positively associated with individual well-being. For the purposes of the healthcare context, in this study, high performance was equated with lower levels of work-related stress and work-related injuries. Results relating to each of these well-being indicators will now be discussed.

##### **3.4.2.1 Experiences of work-related stress**

Real team-based working was negatively associated with work-related stress. Table 3.1 shows that, for staff working in Acute NHS Trusts, the odds ratio for experiencing work-related stress was again significantly higher for respondents who reported working in pseudo teams than for those working in real teams or not working in teams at all (OR, 1.33, 1.27 respectively). Furthermore, table 3.2 indicates that the odds ratio for experiencing work-related stress was significantly higher for respondents working in pseudo teams which were a) missing all three of the real team criteria or b) missing any two of the real team criteria, than for those respondents working in real teams (OR, 1.48, 1.55 respectively).

Again, results from the third set of regressions indicated which particular aspects of real team working were most important for experiencing work-related stress. Results from the regressions indicated that the experience of work-related stress was again highest for those respondents who worked in teams in which members do work together closely and interdependently, but the team does not have clear objectives, nor does the team meet regularly to reflect upon its tasks and objectives (missing a and c; OR, 1.80). Further, among pseudo teams missing just one of the real team criteria, the odds ratio for suffering work related stress was highest for teams which do not have clear objectives (missing a only; OR, 1.63).

### ***3.4.2.2 Experiences of work-related injuries***

Finally, real team-based working was also negatively associated with work-related injuries. Table 3.1 shows that, for staff working in Acute NHS Trusts, the odds ratio for experiencing work-related injuries was significantly higher for respondents who reported working in pseudo teams than for those working in real teams or not working in teams at all (OR, 1.38, 1.45 respectively). Furthermore, table 3.2 indicates that the odds ratio for experiencing work-related injuries was significantly higher for respondents working in pseudo teams which were a) missing all three of the real team criteria, b) missing any two of the real team criteria or c) missing any one of the real team criteria, than for those respondents working in real teams (OR, 1.37, 1.44, 1.37 respectively).

Again, results from the third set of regressions indicated which particular aspect of real team working was most important for experiencing work-related injuries. Results from the regressions indicated that the experience of work-related injuries was again highest for those respondents who worked in teams in which members do work together closely and interdependently, but the team does not have clear objectives, nor does the team meet regularly to reflect upon its tasks and objectives (missing a and c; OR, 1.65). Further, among pseudo teams missing just one of the real team criteria, the odds ratio for experiencing work-related injuries was highest for teams which do not meet regularly to reflect upon tasks and objectives (missing c only; OR, 1.44).

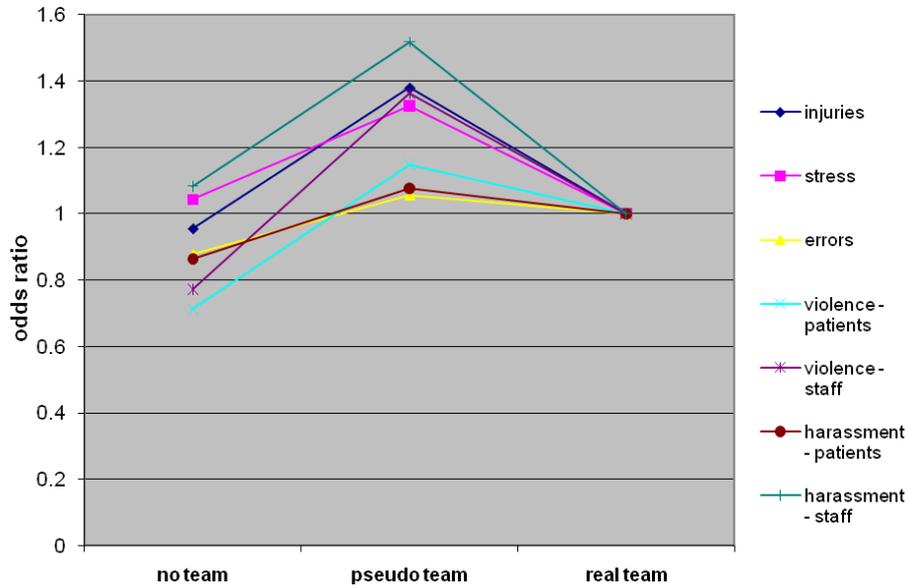
### ***3.4.2.3 Summary***

The overall consistency in the results from the two outcome measures of well-being suggest that hypothesis 3.2 can also be accepted. Real team-based working was significantly negatively associated with work-related stress and work-related injuries. An interpretation of these results is provided in the following discussion section.

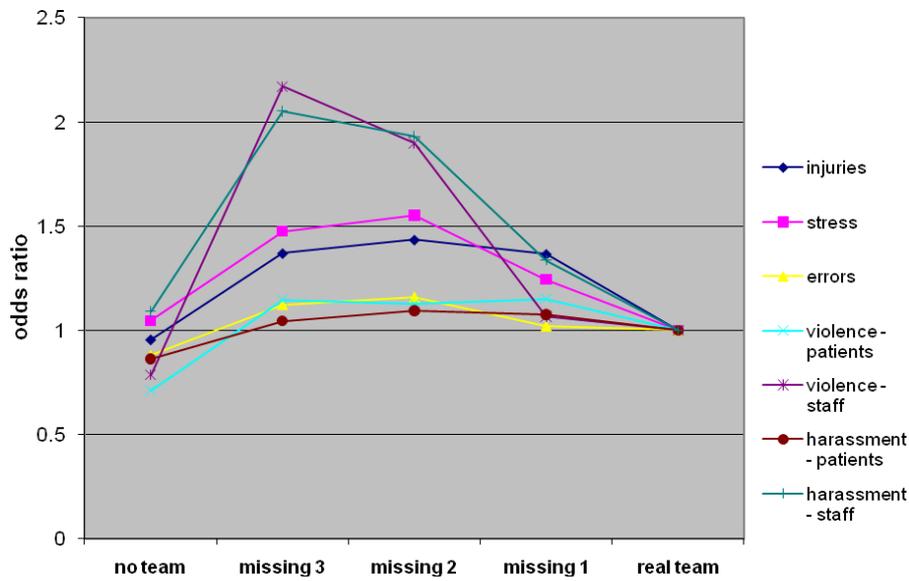
In summary, across the two hypotheses, a consistent pattern of the associations of real and pseudo team working with safety related outcomes was evident. A clear visual representation of the patterns that emerged from the data is provided in figures 3.1 and 3.2, which depict the patterns of results from the 3-team and 5-team typologies. Reflecting the results from hypotheses 3.1 and 3.2, the graphs show that performance and well-being outcomes are typically more favourable for those working in real teams, compared to those working in types of pseudo teams. However, it should be noted that on both of the graphs, the 'no team' category appear to have the most favourable outcomes overall on a number of the

performance and well-being indicators. These results can be explained by looking at the specific occupational groups of those respondents who reported that they did not work in a team.

**Figure 3.1: Relationships between 3-team typology and outcome measures**



**Figure 3.2: Relationships between 5-team typology and outcome measures**



Of the 18,682 ‘no team’ respondents, the largest percentage was made up of administration and clerical staff (20.6%). By considering the types of tasks typically involved in administration and clerical jobs, it is arguable that team working in these areas of work is not necessarily the most efficient way to work. In comparison to the multi-faceted and demanding work of clinical staff dealing with a variety of patient needs, the nature of administrative and clerical work is typically less complex in nature, and is therefore more

suitable for individuals rather than teams (Hackman, 2002). Indeed, low-complexity tasks might actually be performed more effectively by individuals rather than teams. Not only are the synergistic gains of teams unnecessary for these types of tasks, but process losses inherent in team working may actually hamper team processes and performance. Furthermore, unlike frontline clinical staff working, administrative and clerical staff are typically more removed from actual delivery of acute healthcare to patients, such as working in operating theatres or recovery wards. As can be seen from figures 3.1 and 3.2, respondents in the 'no team' category report having more favourable outcomes compared to those working in real teams on the indicators of injuries, errors, harassment, bullying or abuse from patients, violence from staff and violence from patients, all of which are less likely to occur in non-clinical settings such as offices or receptions. The other most common occupational groups represented in the 'no team' category included NHS infrastructure (4.5%), maintenance/ancillary (5.7%) district and community nurses (5.5%) and general management (2.9%). Again, given their removal from the complex hospital environment of the actual delivery of acute healthcare to patients, as well the nature of the tasks that such staff typically carry out, the same arguments can be made as above. Overall, this suggests that the comparison of results between the 'no team' group and any of the team (real or otherwise) groups should be carried out with caution, and attention should be paid to the type of tasks respondents are carrying out, the environment within which they are working, and whether team working is even necessary in the first place. As Hackman (1987) points out, one of the most important threats to effective teamwork is that the task itself does not require a team.

### **3.5 DISCUSSION**

The results from this study provided clear and consistent evidence for the beneficial effects of real team working on performance and well-being outcomes in the context of NHS Acute healthcare. To summarise the main findings of this study, support was found for both of the hypotheses related to the various specific outcomes. Based on the emergent patterns within the data (see figure 3.1), it is evident that working in real teams is clearly more beneficial than working in pseudo teams, in terms of improved work-related safety outcomes. The positive effects of real teams are particularly pronounced in terms of harassment from staff, injuries and stress, with weaker effects being found for experiences of errors, near misses, or incidents, and violence from patients. Figure 3.2 also highlights that when pseudo teams are missing two or all three of the real team criteria, the negative impacts on outcomes are greatest. Findings relating to each of the two hypotheses will now be discussed in more detail.

### **3.5.1 Real team-based working and performance**

Hypothesis 3.1 stated that real team-based working will be positively associated with performance. Given that results demonstrated that real team-based working is negatively associated with each of the performance outcomes, this hypothesis can be accepted. Results relating to each of these performance indicators will now be discussed in more detail in turn.

With regards to the two performance outcomes relating to bullying, harassment or abuse, results showed that the effects of real team-based working on the harassment, bullying or abuse from work colleagues were notably stronger than for harassment, bullying or abuse from patients. The source of harassment, bullying or abuse must therefore be paid further attention. In some instances, regardless of whether a team is a real team or a pseudo team, the behavior of patients and the external environment within which the team must operate cannot be anticipated or controlled. However, having clear objectives, interdependence and engaging in team reflexivity is likely to have a direct effect on internal team functioning and the behavior of team members themselves. Given that the work colleagues which participants were referring to in this question were likely to be members of their own work teams (or at very least working in close physical proximity), those who reported working in real teams were likely to work with fellow team members who were also guided by the same team structure and processes. Clearly stipulated team objectives, high levels of interdependence, and the frequent interaction inherent in real teams means that team members will be more likely to work together in a collaborative and cooperative manner and thus less likely to engage in harassment, bullying or abuse of colleagues. In terms of the nine different team-typologies, members of teams which work together interdependently but do not have clear team objectives and do not regularly meet to reflect upon performance had the worst outcomes in terms of bullying, harassment or abuse from both patients and work colleagues. The absence of clear team objectives and regular team reflexivity therefore leave team members at greatest risk of experiencing these outcomes. For example, in teams which have unclear objectives, team members may misinterpret each other's roles, contributions or actions, which could result in frustrations, conflicts and disputes. In turn, such negative interpersonal interactions could manifest in incidents of bullying, harassment or abuse, particularly in inter-disciplinary teams where differing priorities, power struggles and a poor appreciation of other professional groups may contribute to infrequent team communication and ambiguous team objectives. Overall, the results indicate that clear team objectives and regular team reflexivity have important theoretical relevance for characterising the sorts of teams that should be inhabiting healthcare organisations, if bullying, harassment or abuse from staff and patients are to be minimised through team-based working interventions.

With regards to the two performance outcomes relating to physical violence, again results showed that the relationship between pseudo team-based work and physical violence from colleagues was noticeably stronger than with physical violence from patients (see figure 3.1). The sources of physical violence (colleague/patient) should therefore be treated separately for discussion.

Unlike results from the other performance indicators in this study, participants who reported the highest levels of physical violence from work colleagues worked in teams which not only lacked clear objectives and reflexivity, but were also missing the interdependence criteria of real teams. Therefore, the presence of all three of these criteria plays an important role in the reduction of physical violence from work colleagues. Again, explanations can be sought by considering the impact of these team characteristics on team functioning and interactions. Members of real teams are likely to work with fellow team members who are also guided by clear team objectives, engage in regular face-to-face interaction, and work together in an interdependent fashion, whereby each team member's contribution is valued and necessary for the overall completion of the team task. As a result of these positive team processes, the chances of experiencing incidents of physical violence from fellow team members is significantly reduced. However, as the results demonstrate, the relationship between real teams and physical violence from patients was not as strong. As was discussed in relation to the bullying harassment and violence outcome, the behaviour of patients within Acute settings occurs independently of internal team functioning. Therefore, the presence or absence of the real team criteria will have less of an impact on a participant's experience of patient violence.

Hypothesis 3.1 also suggested that real team-based working should be negatively associated with witnessed errors, near misses or incidents. Again, results supported this proposition. Participants working in real teams reported witnessing significantly less errors, near misses or incidents than pseudo teams missing two or three of the real team criteria. As is consistent with the findings from the harassment, bullying or abuse outcome, pseudo teams which do not have clear objectives or reflexivity were associated with the worst outcomes, again suggesting that these two real team criteria in particular have important theoretical relevance in predicting the amount of errors, near misses or incidents that are witnessed by healthcare teams. Clear objectives ensure that team members have a thorough understanding of their tasks, which inevitably reduces the likelihood of committing a mistake or witnessing the mistake of a fellow team member. Further, high levels of reflexivity mean that when an error is identified, or an incident occurs, the team reflects on its objectives, processes and

strategies to ensure that the likelihood of such occurrences happening in future are reduced. Therefore, such reflexive behaviours enable a team to learn from its mistakes, which can in turn lead to a reduction in medical errors reported (Edmondson, 1996; 1999).

### **3.5.2 Real team-based working and individual well-being**

Hypothesis 3.2 stated that real team-based working will also be positively associated with individual well-being. Given that results demonstrated that real team-based working negatively predicts each of the individual well-being outcomes, this hypothesis can be accepted. Results relating to each of these well-being indicators will now be discussed in more detail.

Results demonstrated that real team-based working was negatively associated with work-related stress. These findings support those of Carter and West (1999) who also found evidence that well-structured teams experience lower levels of stress. These differences were accounted for by the higher levels of role clarity and social support experienced by those working in well-structured teams (Carter & West, 1999). In terms of the nine team-typologies, participants working in pseudo teams without clear objectives and reflexivity again reported the worst outcomes. Indeed, in pseudo teams, in which objectives are unclear, team members are likely to feel confused about what they are trying to achieve, how they might achieve it, and who is responsible for the outcome. Healthcare staff working in such teams may carry extra psychological burdens as a consequence and such pseudo teams are less likely to achieve their intended effects. This helps to explain why clinical staff who work in pseudo teams actually experienced greater stress than those participants who reported not working in a team at all.

Results also demonstrated that real team-based working was negatively associated with work-related injuries. Findings closely mirrored those of the other performance and well-being measures in this study; participants belonging to real teams reported significantly less work-related injuries than those belonging to pseudo teams, with members of pseudo teams which lack clear objectives and reflexivity reporting the worst outcomes overall. Similar arguments can be made here to those made for the errors, near misses or incidents performance outcome from hypothesis 3.1. In order to establish clear objectives, team members firstly have to interact with one another in close proximity. This close interaction allows team members to become familiar with one another, understand each other's strengths and weaknesses, and even compensate for one another in times of fatigue or absence. Indeed,

in a study of flight crew teams by Foushee, Lauber, Baetge, and Acomb (1986), teams that had worked together for a number of days, despite being fatigued, made significantly fewer errors than well-rested teams who had not yet worked together at all. In terms of the presence of reflexivity, reflexive teams spend time reviewing their past performance, discuss potential strategies in the future, and assess the potential risks of doing things differently. Hackman (1993) proposed that teams can act as self-correcting performance units. As a result, the chances of a team member experiencing an injury during the execution of their tasks are reduced. However, it should be noted that even teams which exhibit all of the real team characteristics may still be vulnerable to experiencing work place injuries that are a result of factors in the wider organisational environment. For example, faulty equipment, lack of resources, violent patients or other workplace hazards.

### **3.5.3 General discussion**

Overall the results of this study demonstrate that if staff identify as working in a team, yet their team lacks clear objectives, reflexivity and interdependence, then any arguments for the beneficial outcomes of team-based working in healthcare, at least in terms of these work-related safety outcomes, appear to be redundant. If teams do not meet the criteria of real teams presented in this chapter, then it would be in service providers, patients and NHS organisations interests for staff to work on an individual basis rather than in a pseudo team fashion. The three real team criteria discussed here each demonstrate important theoretical relevance in characterising the teams that should be inhabiting NHS organisations. The presence of clear objectives and reflexivity were particularly important in the reduction of work-related safety outcomes investigated in this study. These findings have serious implications for team-based healthcare organisations, which may not be implementing, structuring and managing their teams properly. Indeed, poorly-structured pseudo teamwork may actually facilitate negative work-related safety experiences in the workplace. Given that stress has been linked to efficacy of healthcare provided (AbuAlRub. 2004), ensuring that real team working is implemented wherever teamwork is required for patient care is vital. Indeed, West et al. (2002) found the percentage of staff working in teams is a significant predictor of lower patient mortality. The unfortunate reality is that poorly structured teams put patients' lives at risk (Mayor, 2002) and it seems that pseudo teams, which exist where team-based working has not been implemented with thorough integration, are a common characteristic of many of today's acute healthcare organisations.

In the UK, team working has been highlighted in the government's vision for the improved quality of care (Department of Health, 2001), and along with leadership, is emphasised as being at the heart of Clinical Governance (Scally & Donaldson, 1998). The use of teamwork in the promotion of the quality and efficiency of public health is also largely encouraged by the World Health Organisation. However, as this study shows, working in teams per se should not be mistaken for a panacea for team effectiveness, or for worker and patient safety. The findings also suggest that improving experiences of work-related safety outcomes for staff requires Acute NHS organisations to ensure that the appropriate conditions for facilitating the presence of clear objectives, interdependent working and reflexivity are in place for all teams. Therefore, the apparent motherhood of endorsing team working, particularly in the context of the NHS, must be replaced by a rigorous evaluation of its implementation and intervention to ensure that the teams themselves are real teams. When we get it right, successful teamwork is associated with innovative and effective healthcare delivery (West, Borrill & Unsworth, 1998).

#### **3.5.4 Limitations**

As with any study, a number of methodological limitations must be acknowledged. High representation of the total population, the high response rate, the small number of invalid responses and the small amount of missing data all suggest representative and unbiased data collection. As part of a large scale national survey with various questions from a range of areas, it is unlikely that individuals would give systematically biased responses based on specific assessments of their teams and work-related safety outcomes. However, one weakness of this study is its cross-sectional, same-source design. Although self-report data is encouraged in the field of adverse events research, such as medical error research (Carter et al., 2008), it remains possible that psychological affect could influence responses of both independent and dependent variables. The limited organisational context within which the hypotheses were tested also has implications for the generalisability of the findings. Similar research should be carried out in other Trust-types in the NHS (e.g. Mental Healthcare Trusts, Ambulance Trusts or Primary Care Trusts) as well as in private healthcare organisations in England and also internationally, to see if the same results are generated. Further, given the approach to data collection, the aggregation of data to the team-level of analysis was not possible in this study. All of the measures in the National NHS Staff Survey refer to the individual level, and therefore it was not possible to take a multi-level approach to data analysis. This would have been advantageous as patterns and trends at both the team and organisation level could have been identified.

Finally, a main limitation with the current study is the conceptual and methodological approach employed to measure real teams. Firstly, although the criteria used for defining real teams (clear objectives, interdependence and reflexivity) in the National NHS Staff Survey were originally based on logical theoretical deduction, the scale itself has not been validated. Further, the binary (yes/no) response scale is used with constructs that are theoretically continuous in nature. Indeed, theoretical arguments suggest that there is not such a dichotomy between real teams and pseudo teams. Defining to what extent a team has clear objectives for example is not a binary construct; some objectives may be clearer than others, and individuals within a team will interpret the objectives differently. The lack of rigorous theoretical underpinning and validation, along with the crude binary response scale to measure real teams constitute two major limitations of the current scale used in this study, and form the starting point for the development of a new scale. These limitations and possible solutions are discussed in chapter 4.

### **3.5.5 Implications for conceptualising Real Teams**

So what does this study add to our existing understanding about the presence for real teams in today's organisations? Indeed, chapter 2 of this thesis already outlines a clear case for the importance of real teams, and provides a strong argument for the need to develop an agreed conceptualisation. The existing research evidence presented emphasises the benefits that team-based designs can have over alternative approaches to work. Chapter 2 also highlights the problem that a shared mental model of the science of teams is yet to be found, and discusses the implications that such a consensus could have for future research in the area. However, what the existing literature discussed in chapter 2 does not clearly emphasise is the severe and detrimental effects that *pseudo* teams can have on important organisational outcomes. In the study presented here, only 50% of staff working in the NHS reported working in real teams. In turn, and even more worryingly, 37% of staff reported working in pseudo-teams, with such superficial group forms being significantly associated with harmful organisational and individual outcomes. The compelling findings presented in this chapter must be taken into consideration in the development of the new real team construct, particularly with regards to the characteristics that are used to define real teams in the NHS staff survey. Although there are many definitions of 'team' in the literature, it is not yet clear what the characteristics of real teams are, how real teams can be distinguished other types of groups, and how they can be measured. Therefore, the strong empirical results presented in chapter 3 provide a number of important insights into the real team concept that can, in part, address some of these issues.

Firstly, in terms of establishing the characteristics of real teams, the analysis of the National NHS Staff Survey suggests that the sub-dimensions of shared objectives, interdependence and reflexivity are each important concepts that can be used to define high performing real teams, and distinguish them from groups which are a ‘team by name only’ and which subsequently demonstrate poor work-related safety outcomes. As will be discussed at length in chapter 4, these three theoretical concepts are each retained in the newly developed Real Team Model which incorporates six characteristics that define what real teams are. The results from the NHS dataset also allow for hypotheses to be drawn based on the relationship between real teams and performance. Again, this is explored in greater detail later in this thesis (see section 7.7, chapter 7). Further, the findings from this study also provide a starting point for the conceptualisation of a continuous (rather than a dichotomous) real team construct. As will be discussed in the following chapter, the characteristics that define real teams are inherently continuous in nature, meaning that the dichotomous response scale used in the National NHS Staff Survey needs re-addressing.

Overall, given the substantial lack of research and theorising into real teams in the current literature, as well as the poor awareness about the consequences that pseudo teams can have for important performance outcomes in organisations, the study presented in this chapter has provided a useful starting point for the research into real teams presented in this thesis.

### **3.6 CONCLUSION**

To conclude, the inherent nature of healthcare delivery requires many professionals to work in teams to provide these services. Despite this, the findings from this study suggest that amongst those for whom working in teams is a requisite way of delivering care, there is a large percentage who are working in poorly oriented collective entities which do not meet any of the criteria which theoretically characterise teams. The simple creation of healthcare teams is clearly not an effective solution to the high levels of safety related outcomes in acute settings. It is therefore important that acute healthcare managers get team-based working right from the start, ensuring that each and every healthcare team is a real team and has the appropriate work structure, support and resources required for fostering a clear objectives, close interdependent working, and time to communicate with one another and reflect on their tasks.

## **Chapter 4: A clarification and extension of the real team construct**

### **4.1 CHAPTER SUMMARY**

As team researchers, we need to be able to define *what is a team* and research those, rather than accepting taken-for-granted categorisations offered by managers in organisations. In this chapter, a clarification and extension of the construct ‘real team’ is proposed, demarcating this from other (pseudo-like) team typologies on a sliding scale, rather than a simple dichotomy. A conceptual model for defining real teams is presented, which provides a theoretical basis for the development of a instrument on which teams can be measured for varying extents of ‘realness’.

### **4.2 RESEARCH PROBLEM**

#### **4.2.1 The problem with studying work teams**

Over the years, various attempts have since been made to define teams (e.g. Alderfer, 1977; Guzzo & Dickson, 1996; Hackman, 1987; Hollenbeck, Ilgen, Seago, Hedlund, Major & Phillips, 1995; Kozlowski, Gully, McHugh, Salas & Cannon-Bowers, 1996; Kozlowski & Bell, 2003; Kozlowski, Gully, Nason & Smith, 1999; Salas et al., 1992). Although many of these share attributes, they also include subtle differences and there remains no generally shared definition (Guzzo & Dickson, 1996). In a review of 55 peer-reviewed papers, Rasmussen and Jeppesen (2006) also agree that there is no universally accepted definition of a ‘team’ in the literature. This is not surprising given the convolution involved in studying teams in organisations. One view that team researchers have been able to converge on is that teams are complex, adaptive and dynamic systems (McGrath, Arrow & Berdahl, 2000). Reasons for such difficulty in trying to agree upon a single definition are noted by Kozlowski and Bell (2003); teams can come in a variety of different sizes and types, and across different functions, contexts, internal processes and external links. As a result, various interchangeable terms have been adopted to describe this type of work organisation including ‘work units’, ‘groups’, and ‘teams’. These terms are commonly combined with additional descriptors such as ‘autonomous’, ‘empowered’, ‘high-performance’, ‘co-acting’ and ‘self-managed’, depending on the particular time, task and setting.

The failure of team researchers to reach a definitive consensus upon an accepted description of what defines ‘work teams’ in organisations is still evident in reviews today. In a

recent review on the link between team working and organisational performance, Delarue et al. (2008) avoid venturing into such an ambiguous territory, carefully justifying how they chose the studies for review. Rather than adopting a strict definition of teamwork, they follow a '*phenomenological bottom-line*' (Schumann, Baethge-Kinsky, Kuhlmann, Kurz & Neumann, 1994). In identifying papers for their review they consider the use of the words 'team' or 'group' as a sufficient indication that a paper is suitable for inclusion, leaving the question of '*what is a team?*' open to interpretation. The tendency to pass on this responsibility to future research, or leave the reader to decide, is common in the domain of team research. This lack of clarity and consensus means that researchers are often left to take their definitions of 'team' from organisations. Efforts to identify teams to study typically involve a researcher requesting that only teams with a degree of interdependence or coordination should participate. This might be checked during the recruitment process by simply asking organisational contacts to identify such teams, based on their own impressions of them. Other examples involve the researcher(s) observing the teams directly and making a subjective judgement about whether they constitute an interdependent team (e.g. Schippers, Hartog, & Koopman, 2007). At best (albeit very occasionally), such constructs might be measured in a questionnaire and controlled for during analysis (e.g. Richter, West, van Dick, & Dawson, 2006). Overall, when asking managers to identify teams for study, we too often assume that these entities are the ones which we want to do research with. We do not test the extent to which the collective in front of us is actually a team. Nor do we step back and ask the question '*but what is a team?*' As a result, we are making positivist claims on the basis of socially constructed understandings of managers or our own subjective judgments, meaning that our results are often unclear and inconsistent. In this chapter, it is proposed that this current non-scientific, convenience approach is problematic for the development of team research for a number of reasons.

Firstly, over the past 30 years the discourse of 'teams' has become increasingly pervasive in organisational life (Learmonth, 2009). The general premise that team working will generate superior outcomes has become over-inflated in popular literature. The 'team' label has become intuitively appealing in organisations, in which managers generously assign it to all sorts of collectives of individuals and groups (Sennett, 1998), with the assumption that just by doing so, outcomes will be enhanced. As was discussed in chapter 2, this has been termed by some as the '*romance of teams*' (Allen & Hecht, 2004), where there is an assumption that teams are a panacea for high performance. Teams are popular, and perceived positively by their organisations and managers (Paulus & Van der Zee, 2004). Indeed, management scholars have noted the widespread trend towards team-based structures (e.g.

Muthusamy, Wheeler, & Simmons, 2005; Sundstrom et al., 2000), with recent research reporting that 81% of manufacturing organisations and 79% of Fortune 1,000 companies are using self-managed work teams (Thoms, Pinto, Parente, & Druskat, 2002). Another survey found that Fortune 1000 companies regard teamwork, and how they can best capitalise on it, as their number-one priority (Roomkin, Rosen & Dubbs, 1998). However, not all organisations are suitable for team-based working, and not all work teams are necessarily effective. As a result, copious collectives of individuals in organisations believe that they work in a real team, when in fact they may just be a team by name. As was reported in chapter 3, dysfunctional pseudo-type team working, whereby individuals identify themselves as working in a team yet their team lacks important team characteristics, can actually facilitate poor safety related performance and well-being outcomes in the workplace.

Secondly, people have different things in mind when talking about teams (Hackman, 2002). What represents a team in one organisation can be very different to that of another. Often people report that they are part of a team when they are merely working in close proximity to other people and have the same supervisor. So what specific criteria distinguish a well-structured real team from a group of employees who report that they work as a team, but are in fact, only a team by name? Such groups have previously been identified as pseudo teams (Katzenbach & Smith, 1998) or co-acting groups (Hackman, 2002), and represent collectives of individuals that are characterised by incomplete or dysfunctional aspects of team working. Various pseudo-team typologies were examined in chapter 3, all of which demonstrated the poorest outcomes, in comparison to ‘real team’ and ‘no team’ categories. Indeed, results from chapter 3 indicate that if organisations are to adopt a team-based design, and structure their work in teams, then it is in their interest to ensure that they are populated with teams which are not only identified as so, but are also characterised by a number of defining attributes, namely, clear objectives, interdependence and reflexivity. If teams are not real teams, then the arguments for implementing team-based working become effectively redundant. In fact, assigning the ‘team’ label in conditions where the characteristics of real teams are not met can actually be detrimental to individual and organisational outcomes. Further, as team researchers, we may not wish to incorporate such entities into our research on teams, as by doing so, we may be drawing invalid conclusions based on samples which are not truly representative of the subject we intend to study.

Thirdly, the challenge of defining focal units of theory and analysis has become progressively more important and relevant, particularly since the emergence of multi-level research in the field of management. Over time, as the field has matured, researchers have

increasingly used multi-level lenses to gain a richer, more comprehensive and complex understanding of the phenomenon at hand (Kozlowski & Klein, 2000). Therefore, in identifying a level of theory for a given study, the focal unit from which generalisations will be made (e.g., individual, team, organisation) must be clearly defined (Hitt, Beamish, Jackson & Mathieu, 2007). As Hitt et al. (2007) acknowledge, distinguishing between an individual and a collective is straightforward enough. However, beyond this, it is more difficult to establish where one collective ends and another begins, particularly in an age of team-based organisations. In identifying teams to research, one must first determine whether such entities exist. As was discussed earlier in this chapter, researchers very often rely on formal designations by a manager, such as assignment to a work team, with such conventions often being unsatisfactory (Hitt et al., 2007). As will be discussed in more detail later, some team researchers have confronted these difficulties by clearly defining the focal unit of a real team (e.g. Hackman, 1990; 2002), which has certainly been helpful in guiding the development of coherent theories around teams. However, despite having such clear definitions to guide us, it is likely that, in practice, when going out to organisations to conduct their fieldwork, as team researchers we will still experience some ambiguity when identifying focal units for study (Hitt et al., 2007), particularly if all we have to rely on is our own observations or the opinions of managers. To summarise the problem at hand, when asking managers to identify teams for study in organisations, as team researchers we too often assume that these entities are the ones which we want to do research with. Instead, we need to be able to first define *what is a team* and measure more clearly what we are studying, rather than simply accepting the taken-for-granted categorisations offered by managers in organisations, and assuming that every work group or entity we study is homogenous and defined by the same fundamental characteristics. So what does define a team?

The failure of team researchers to scrutinise the ‘team’ metaphor is an issue that was originally noted by Hambrick (1994) over a decade ago. As will be discussed, despite a number of attempts by team researchers, there still remains a black box as to what exactly constitutes a real team, and how they can be measured. The conceptual debate of what defines an aggregate of people as a group or team in the literature is ongoing (Hamilton, Sherman, & Lickel 1998; Meneses, Ortega, Navarro & de Quijano, 2008). However, this ambiguity has remained largely (and conveniently) unacknowledged in the empirical literature on work groups and teams. Consequently, there remains no validated measure available for team researchers to assess the extent to which teams in organisations are real work teams, rather than more like co-acting groups or even pseudo teams. As a result, research into team working may have bloomed without clarity and coherence. Indeed, Learmonth (2009) argues

that academic organisational analysis adopts the term ‘team’ liberally when representing groups, with seemingly indiscriminate use.

The aim of this thesis is to establish a new set of criteria which form a continuous scale on which teams can be measured in terms of how ‘real’ they are. The development of such a measure is crucial to ensure that we are able to recognise the true processes and outputs of real team working, and avoid drawing important conclusions about all work teams on the basis of research with pseudo teams and such like. Indeed, when doing research with teams in organisations, we must first be clear about exactly what sort of teams we are dealing with. I therefore propose that a more rigorous and scientific approach is required when researchers approach organisations looking to study teams. It is hoped that this thesis will call for a reflective pause on research into teams, with the purpose being to develop a parsimonious and validated approach for identifying and measuring the realness of teams in organisations. In order to accomplish this, I will firstly review existing approaches for defining and categorising real work teams, working groups and pseudo teams, before delineating an extended and comprehensive theoretical model. Before doing so, it should be noted that the aim of this thesis is not to debate the semantics of the term ‘team’. Nor is it an attempt to conceptually distinguish between the words ‘group’ and ‘team’; indeed, in my own commentary, and following the inclination of most team researchers, these terms will be used interchangeably throughout. However, as shall be seen, some team researchers argue that there are qualitative differences between ‘groups’ and ‘teams’. The social psychological literature also views ‘groups’ and ‘teams’ as different entities. Therefore, where appropriate throughout the following sections, these differing conceptualisations will be highlighted and acknowledged.

#### **4.2.2 The ‘real team’ versus ‘pseudo team’ conceptualisation**

As noted above, some researchers have gone to great lengths to distinguish between the terms ‘group’ and ‘team’ (Hambrick, 1995; Katzenbach & Smith, 1993; Parker, 1990; Gully, 2000), while others use the terms interchangeably when defining this form of work organisation (Alderfer, 1977; Cohen & Bailey, 1997; Devine et al., 1999; Hackman, 2002; Kozlowski & Bell, 2003; Sundstrom et al., 1990; Salas et al., 1992; Salas et al., 2005; Rousseau et al., 2006). However, the approach here follows the attempts of previous team scholars (Katzenbach & Smith, 1993; Kozlowski et al., 1999); this thesis is not concerned with what teams are called, or what terminology is used to describe them. Rather, the focus is on what real teams actually are, and whether underlying factors distinguish them from other types of

work organisation. The following section aims to outline and critically explore the existing attempts to explicitly define and measure ‘real teams’ in organisations.

Over the years, there have been a small number of attempts in the organisational psychology literature to define and classify ‘real teams’ from other types of aggregates (Katzenbach & Smith, 1993, 1998; Hackman, 2002; Wageman et al., 2005). Firstly, one well-known example which specifically aimed to distinguish ‘real teams’ from other team typologies, is that of Katzenbach and Smith (1998). The overall aim of their book, *‘The Wisdom of Teams’* was to address the ambiguity which surrounds our thinking about teams and to provide a clearer understanding of *‘what a team is and is not’* (Katzenbach & Smith, 1998, p. 61). The authors constructed their definition of a ‘real team’ primarily through listening to people who were, or had previously been part of a team. Consequently, they define a real team as *‘a small number of people with complementary skills who are equally committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable’*. (Katzenbach & Smith, 1998, p. 45). The authors propose a number of different team typologies: working groups, pseudo teams, potential teams, real teams and high performing teams, each of which are placed on a team performance curve whereby each successively outperforms the previous. The general premise is that high performing teams will always outperform real teams, who themselves will always outperform similar groups of individuals who are working alone or who are operating in an effective working group. Further, effective working groups will always outperform pseudo-teams. Essentially, Katzenbach and Smith (1993) assert that groups become teams when they strive for synergy among members and a sense of shared commitment (Guzzo & Dickson, 1996). The authors offer useful insights into strengthening group performance, providing readers with practical questions which can be used to assess a group’s current situation. Questions relate to each of their criteria for real teams, an example being: *‘Do you have adequate levels of complementary skills and skill potential in all three categories necessary for team performance?’* However, in interpreting answers, the authors do not state what an adequate level is, leaving readers to decide on an appropriate level for themselves. As the reader, how do we know where pseudo teams stop and potential teams start? Where is the cut off point between potential teams and real teams? If we are not clear on this, how do we know the typology to which a particular team belongs? Although they are clear and explicit in their definitions of the different team typologies, Katzenbach and Smith (1998) are far less specific about where the exact distinctions between each type of team can be drawn. For example, the authors describe how teams can change their behavioural repertoires in order to move ‘from’ working potential teams ‘to’ real teams by encountering significant conflict and nurturing

trust, interdependence and hard work. However, as will be discussed in more detail, it is both theoretically and practically impossible to treat such concepts as dichotomous or categorical entities, meaning that a simple dichotomy for demarcating real teams from potential teams, or potential teams from pseudo-teams, for example, is unlikely to be found. Overall, despite providing a highly descriptive account of different team typologies, Katzenbach and Smith's conceptualisation has never been published in a peer-reviewed journal, and the appropriateness of their semi-quantitative method is questionable (Fisher, Hunter & Macrosson, 1997). Indeed, no empirical evidence exists to confirm the theory. Nor are there any validated scales through which the theory can be operationalised for use with teams in today's organisations.

Another more recent conceptualisation of real teams was put forward by Hackman (1990; 1992; 2002) and later revised by Wageman et al. (2005). Despite the various definitions in the literature, in reality people have different things in mind when they talk about teams (Hackman, 2002). Often people report that they are part of a team when they are merely working in close proximity to other people, and/or have the same supervisor. Hackman (2002) argues that in such cases, these teams are not real teams; rather, they are just co-acting groups, as their task does not require them to work together collectively, nor are all members accountable for the tasks' completion. Real teams are more than simply a collection of individuals co-acting with one another (Paris et al., 2000; Hackman 2002), nor are they a team by name only. Hackman (2002) argues that real teams have four distinct features: clear boundaries, interdependence, moderate stability of membership and authority to manage their own work processes. In a subsequent publication of the Team Diagnostic Survey (TDS), Wageman et al. (2005) revise the original conceptualisation to argue that real teams in fact have just three distinct features. Firstly they have clear boundaries, whereby members can be reliably distinguished from non-members. Secondly, real teams work together interdependently towards a common goal or purpose, meaning that all members are collectively responsible for an assessable outcome. And thirdly, they are stable over time, meaning that they have at least moderate stability of membership. Teams with stable membership perform better as the prolonged time together gives team members the opportunity to build relationships and learn how they can best work well together (Hackman, 2002). In the TDS, eight questions are provided to probe the degree to which a team is bounded, has interdependent work, and is stable over time. An example includes: *'team membership is quite clear – everybody knows exactly who is and isn't on this team.'* (Wageman et al., 2005, p. 382). However, the overall 'real team' scale was broken down into its three sub-components during analysis, and treated as part of the overall TDS instrument.

Hackman's conceptualisation of what constitutes a real team differs somewhat from that of Katzenbach and Smith (1998). Although both generally capture composition, structure, and task components of a team, they focus on different aspects of each. Hackman's (2002) 'membership stability' sub-dimension is particularly arguable for the purposes of application to work teams in today's organisations. Indeed, many work teams today are short lived, with frequent changes in membership. Common examples include short-lived project teams or multi-disciplinary health care teams, in which individuals who were previously unfamiliar with one another come together to work closely and independently on a specific task, after which the team adjourns. Hackman's conceptualisation would suggest that such teams cannot be real teams. However, as shall be seen, the conceptualisation presented in this thesis is somewhat different and seeks to amend, extend and validate Hackman's existing model, incorporating the important findings from chapter 3. Justification for doing so lies in a number of methodological and theoretical shortcomings of existing approaches, each of which will be outlined in the following section.

#### **4.2.3 Work teams as a continuous construct**

From a methodological perspective, existing conceptualisations share a similar problem with regards to distinguishing real teams from other team typologies. Indeed, none of the existing attempts described in the previous section provide an indication of a threshold or cut-off point where co-acting groups stop and real teams start. Nor do the authors give any suggestions about the relative weight of each criterion for real teams, or about the implications of different configurations of these criteria. This leaves the reader to assume that a dichotomy exists between teams that demonstrate the properties of real teams, and those teams who simply do not.

In line with the dichotomous conceptualisations already discussed, Aston University researchers have also classified teams into 'real teams' and 'pseudo teams' using a small number of yes/no items in a questionnaire: *Does your team have clear objectives? Do you have to work closely with other team members to achieve the team's objectives? Does the team meet regularly to discuss its effectiveness and how it could be improved?* This approach was adopted in chapter 3 of this thesis, with results indicating that the presence of clear objectives, interdependence and reflexivity in teams have important consequences for vital work-related safety outcomes in the NHS. However, as previously discussed, although these criteria were originally based on logical theoretical deduction, the scale itself has not been validated, and is conceptually questionable given that a binary response scale is used with

constructs that are theoretically continuous in nature. Indeed, theoretical arguments suggest that there is not such a dichotomy between real teams and pseudo teams. Defining to what extent a team has clear objectives, for example, is not a binary construct; some goals may be clearer than others, and individuals within a team will interpret the goals differently. A similar argument can be made for the other criteria that have been put forward for defining real teams. For example, task interdependence is not a dichotomous construct. Some teams may be more interdependent than others and it is impossible to determine exactly where the cut-off point lies between interdependence and independence. Given the increasing complexity of tasks in today's organisations, interdependence exists in various forms at varying levels both within and between teams. Similarly, when assessing whether a team reviews its performance to improve effectiveness, there is no black or white answer. Although two different teams may both report that they review their performance to improve effectiveness, the binary response scale used in the National NHS Staff Survey cannot possibly capture the subtle discrepancies between these two teams, and would simply assume that they were equal in terms of their engagement in task reflexivity. Overall, when combining a number of dimensions to form a real team construct, it is both theoretically and practically impossible to establish where pseudo teams stop and real teams start. Given that none of the existing criteria used for defining real teams can be binary constructs either theoretically or practically, likert responses to each dimension would be more appropriate. This would allow for a sliding scale or continuum of how *real* a team is. In combination, the characteristics used to define a real team would anchor the ends of a 'team realness' continuum. This approach constitutes a methodological contribution of this thesis, whereby the existing approach adopted by the National NHS Staff Survey (see chapter 3) is extended. The newly extended real team model is presented in section 4.4. However, before this, a set of literature from social psychology will be briefly discussed to provide additional insight into our understanding of how to conceptualise work groups and teams.

#### **4.2.4 An insight from the small group literature**

As was previously highlighted, the literature on small groups originates from the field of social psychology, with scholars in the area positioning their work on 'groups' in a separate theoretical realm to research on 'teams' in organisational behaviour. However, despite the tendency to separate the two research areas, along with the increasing decline of group research in social psychology (Levine & Moreland, 1990), as well as the surge in work-team literature in organisational psychology (for a review see Kozlowski & Bell, 2003), small group research still has a highly relevant and important contribution to make in addressing the

conceptualisation of real teams, in terms of the criteria used to define teams, as well as the conception of the phenomenon as a continuum.

Unlike the concept of ‘team realness’, the concept of ‘groupness’ has been used in the small group literature for many years. Most relevant for the purpose of this chapter is the construct of groupness introduced by McGrath (1984), which was a direct manifestation from socio-technical systems theory (Cummings, 1978; Lewin, 1951; Trist, 1981). McGrath (1984) started with the conception of groups as ‘fuzzy sets’; this ‘fuzzyness’ being represented by the number of members in a group, the scope of behaviours and situations in which the group behave interdependently, a degree of awareness of group belonging, and the extent to which the groups history impacts on relationship patterns. Argote and McGrath (1993) subsequently conceptualised work groups as systems in which repeating and complex patterns of dynamic relationships between members occur, whilst using technologies to achieve common group goals. McGrath (1984) also addressed whether ‘groupness’ was in fact a question of degree, as opposed to a matter of ‘absence’ or ‘presence’, suggesting the groups may vary in the extent to which defining group characteristics are present.

More recently, a conceptual paper published in ‘Small Group Research’ (Meneses et al., 2008) grapples with the similar research question addressed in this thesis – ‘*what are the criteria that enable a set of people working together in an organisation to be defined as a group (and) should groups be considered as a continuous or dichotomous phenomenon?*’ (p. 493). Although the underlying theoretical perspectives adopted in this paper (namely general systems theory, sociocognitivism, gestalt psychology and soviet social psychology) are somewhat different to those followed here (see next section), the paper offers a useful insight into the origins of group development which can help inform the conceptual development of real teams in this thesis. Meneses et al. (2008) propose that five fundamental criteria define the existence of work groups; interrelationship, shared goals, identification with the group, group coordination, and social value of the task. Following McGrath (1984), they also place these criteria on a progressive continuum to capture the level of group development, although they admit that they are unclear whether teams lie at the top of this continuum (assuming that the terms groups and teams should be used separately, and not interchangeably as they are here). Although the paper offers an alternative theoretical paradigm for conceptualising groups and teams, the main contribution which is relevant for this thesis is the continuous approach proposed for understanding such entities. Meneses et al. (2008) support the perspective taken here. Rather than assuming that there are fundamental divergences between

the types of groups and teams at hand, they instead they propose that there are *degrees of difference* between them, which can be captured on a continuum.

### **4.3 REAL TEAMS DEFINED**

#### **4.3.1 Underlying theoretical perspectives**

In order to initiate the conceptualisation of the real team construct, a number of underlying theoretical perspectives were firstly explored in order to understand why people work in teams in the first place. Given the notable shift over the past thirty years from a focus on interpersonal groups in social psychology to work teams in organisational psychology (Moreland et al., 1994; Levine & Moreland, 1990), it was necessary to consider theories from both fields. Although in isolation none of these theoretical perspectives address the precise problem of defining what a real team is, they each contribute to our understanding of social behaviour, helping one to predict how and why humans operate in groups, and how these behaviours impact outcomes. Thus, three theoretical perspectives, interdependence theory, social identity theory, and self-regulation theory serve to broadly underpin the subsequent real team model presented in this thesis. Each will now be discussed in turn.

##### **4.3.1.1 Interdependence theory**

Although most influential psychological theories adopt an individual level perspective, explaining within-person behaviours through biological and cognitive processes, interdependence theories look beyond the individual actor and focus on interpersonal situations and how individuals interact with one another in different situation structures. Taking situation structure into consideration is important because it is within this structure that an interpersonal reality is formed, interactions unfold, motivation is activated and cognition is orientated (Rusbult & Van Lange, 2008). Interdependence theory developed from the principle proposed by Lewin (1946) that behaviour is a function of the person and the environment. From this theoretical perspective, the essence of a group is the interdependence between its members (Lewin, 1948).

There are a number of different theoretical perspectives that have guided research on interdependence, which fundamentally stem from one of two fields; organisational theory (Thompson, 1967; Van de Ven & Ferry, 1980) and social psychology (McGrath et al., 2000; Shaw, 1973; Wageman, 1995). An example of the former includes the work of Thompson (1967), who views interdependence as a characteristic which is inherent in the technology of

the team task itself. Therefore, team-level goals and outcomes are dependent on the technological requirements of the task. However, this perspective is questionable, as research has shown that levels of interdependence can vary between teams who have similar technologies and structurally identical tasks (Campion et al., 1993; Shea & Guzzo, 1987; Wageman, 1995; Wageman & Gordon, 2005). In line with Stewart and Barrick (2000), I follow the social psychological conceptualisation of interdependence, which has become known as ‘cooperation requirements’ (e.g. Shaw, 1973). As well as acknowledging the specific task requirements of the work, this perspective extends to consider the social interaction and cooperation requirements needed for a team to successfully meet their collective objectives (McGrath et al., 2000; Wageman, 1995). Under this perspective, structural features of a team’s task (that are not dependent on technology) can be manipulated and controlled in order to manage team interdependence (Saavedra, Earley & Dyne, 1993).

Probably the most influential of interdependence theories in the organisational behaviour literature is Deutsch’s theory of cooperation and competition (1949; 1969; 1973). Deutsch (1949) proposed that there are three alternative goal interdependencies that define how people perceive their goals to be related; cooperation, competition, and independence. Under cooperative interdependence, people perceive their goals to be positively interrelated. In such circumstances people are dependent on the effective performance of others if they are to successfully attain their own goals. Here, the success of others is important, and a group is said to ‘*sink together or swim together.*’ Under conditions of cooperative interdependence, members of a group must engage in co-ordinated social and task interactions if they are to successfully meet their related goals. Conversely, under competitive interdependence, people perceive their goals to be negatively related, meaning that if others perform effectively, they are less likely to attain their own goals. One is more successful when others fail and vice versa. Finally, under conditions of independence, people perceive their goals to be unrelated to those of others, with the performance of others having no impact on one’s own goal attainment. In reality, most situations dictate a mix of these goal interdependencies.

As was discussed in chapter 2, teams are typically implemented in organisations when the task itself is sufficiently complex and multi-faceted that it cannot be completed by individuals working in isolation. Socio-technical systems theory (Cummings, 1978; Lewin, 1951; Trist, 1981) proposes that self-regulating teams are the optimal work design choice for such tasks. Further, the intuitively appealing premise of synergy, which proposes that collective team efforts will accomplish more than sum of individual abilities and efforts (Zaccaro, Heinen & Shuffler, 2009), has fuelled the recent growth in team-based

organisations. This increase in capacity for high performance afforded by the interaction of team members has also recently been termed as *'the wisdom of collectives'* (Salas et al., 2009). Indeed, the information/decision making perspective on work group diversity (cf. Van Knippenberg & Schippers, 2007) suggests that the diversity which is inherent in work groups creates a larger pool of knowledge for a team to draw from during decision making. This in turn has a positive impact on team outcomes such as creativity, decision quality and problem solving. These two fundamental propositions about teamwork suggest that interdependence theory, specifically in relation to the presence of cooperative interdependence in teams, provides a crucial theoretical lens for explaining why so many organisations are structured in teams, and, indeed, why humans have worked in groups for thousands of years. Such interdependence implies that members of a group quite simply *need* each other for a given purpose (i.e. to achieve tasks and/or goals), and that this is why people work in teams. Conversely, *'if individual tasks are independent of each other neither co-ordination nor common planning is required nor does real group work exist'* (Antoni, 2005; p. 176). Hence interdependence theory and its implications provide a crucial theoretical lens for defining real teams, particularly for the incorporation of the 'interdependence' and 'shared objectives' into the Real Team Model. This will be discussed in more detail in section 4.4.

#### ***4.3.1.2 Social identity theory***

Social identification is defined as the perception of oneness with or belongingness to a human group (Ashforth & Mael, 1989). Among the most primary of innate human needs are the needs for belonging and acceptance into social groups. According to social identity theory (Tajfel & Turner, 1986), membership to a group represents an important component of self-identity, which in turn directly influences behaviour and attitudes. Depending on the types of relationships they are involved in, people have multiple social identities which vary in terms of value, importance and permanence. However, only one social identity can operate in any given situation; this salient identity serving to govern an individual's social perception, self-construal and social conduct (Hogg, 2006).

In general, social identity refers to *'an individual's knowledge that a person belongs to certain social groups, combined with some emotional and value significance of this group membership'* (Tajfel, 1978, p. 63). However, more recent research has distinguished four types of social identity (Brewer, 2001). Firstly, person-based social identities relate to how group properties are internalised by group members, becoming part of their self-concept. Secondly, relational social identities emphasise how one defines oneself in relation to others

within their group. Thirdly, group-based social identities reflect social identity as it is traditionally defined (see above). And finally, collective identities refer to when group members not only share their self-defining attributes, but together strive to forge a collective representation of what the group stands for and how it is viewed by others. As shall be discussed, these two later types of social identity are of particular relevance for conceptualising real teams in organisations.

Social psychology has long been concerned with the human being's propensity to favour the groups to which we belong (Sumner, 1906). Given that group membership represents a key component of self-identify, the groups to which we belong constitute a significant source of self-esteem. By increasing the status of a group relative to other out-groups, one can in turn fulfil self-esteem needs (Fein & Spencer, 1997). To identify with a group means that an individual perceives them self as psychologically entwined with the fate of their group (Ashforth & Mael, 1989). Strong identification with a group motivates people to exert effort on behalf of the group towards group goals and compensate for other group members. A strong group identity is also likely to engender the internalisation of, and conformity to, the group's norms and values, and a convergence in the attitudes and behaviours of team members. When a team member has a strong team identity they are likely to spend more time in their team role. Identification with a team also enhances support for and commitment to it (Ashforth & Mael, 1989), as well as impacting on processes such as cooperation, cohesion, altruism and positive group evaluations (Turner, 1982; 1984). Bounded social groups hold the same definition of who they are, what their attributes are, and how they relate to people who are outside of their group. Thus, through the development of a collective self-construal, members of a social group identify and evaluate themselves in the same way (Hogg, 2006).

In examining social identity theory, an individual's identification with their work group(s) within an organisation is of primary interest for the purposes of this thesis. Given the multi-team systems which comprise team-based organisations, work teams very often compete with each other for resources and recognition. Research has shown that during such competitive environments, group boundaries are drawn more sharply, and in-group/out-group differences are accentuated. Further, clear group boundaries enhance the distinctiveness of a group's values and norms, making members even more aware of their in-group and the out-groups which surround them (Brown & Ross, 1982; van Knippenberg, 1984; cf. cognitive differentiation hypothesis, Dion, 1979). As a result, in highly bounded teams, an individual's

social identity with their group becomes even more salient, and group members see their own group as a unique and distinct entity (cf. Tajfel, 1969).

According to Hogg, *'social identity theory defines 'group' cognitively – in terms of people's self-conception as group members. A group exists psychologically if three or more people construe and evaluate themselves in terms of shared attributes and distinguish themselves collectively from other people'* (Hogg, 2006, pp. 111). Social identity researchers argue that in order for individuals to infer group norms from the behaviour of others, at least three people must exist within a collective for it to constitute a group (Hogg, 2006). Further, from a social identity perspective, these individuals must identify with the group. Although the role of shared goals, interdependence, interaction, and so forth, are acknowledged in the development of cohesion and entitativity (i.e. a collective seems more like a team rather than separate individuals; Hamilton & Sherman, 1996), social identity theorists maintain that the very essence of what it is to be a group is social identification (Hogg, 2006). This theoretical perspective would argue that it is the psychological process of identification that underpin the criteria of real teams. Team members may have a common objective, task interdependence, and be recognised by their organisation as a team, but if individual team members do not share a sense of belonging and identification with their team, and do not define and evaluate themselves in relation to the teams norms and values, they are unlikely to feel, think and behave as a member of the team (Hogg, 2006).

In recognising that groups and teams vary on many dimensions (function, size, structure, longevity etc), the inter-group relations literature has drawn a distinction between similarity-based categorical groups and interaction-based dynamic groups (McGrath et al., 2000; Wilder and Simon 1998): what Prentice, Miller, and Lightdale (1994) similarly refer to as common-bond groups (groups based upon attachments among members) and common-identity groups (groups based on direct attachment to the group). Such typologies can be traced back to the work of Tönnies (1955) who originally distinguished between *Gemeinschaft* ('community' social organisation based on close interpersonal attachments) and *Gesellschaft* ('association' social organisation based on impersonal formalised relations). However, regardless of these differences, social identity theorists still argue that identification is what defines the essence of 'groupness' (Hogg, 2006). Thus, from the social identity perspective, a team is psychologically real only when team members identify with it. Thus, *'social identity is the cognitive mechanism which makes group behaviour possible'* (Turner, 1982; p. 21). As shall be discussed in more detail in section 4.4, social identity theory provides a crucial theoretical lens for conceptualising criteria of real teams, and is particularly

useful for justifying the inclusion of the concepts of ‘boundedness’ and ‘specified roles’ in the real team model, which will be detailed later in this chapter.

#### ***4.3.1.3 Self-regulation theory***

Since the early days of the Hawthorne studies, research in occupational psychology has gradually adjusted its focus from ‘the worker’ to the ‘purposeful, goal-striving individual’, and the processes through which these goals are achieved (Vancouver & Day, 2005). Drawing on the work of Bandura (1986), this has become known as the ‘self-regulation’ perspective. The social cognitive theory of self-regulation (Bandura, 1991) posits that human behaviour is extensively regulated and motivated by the continuous exercise of self-influence. According to Bandura (1991), most human behaviour, given that it is purposive, is regulated by forethought. Human beings have the unique capability to reflect on the past and form beliefs about their prospective actions and behaviours in the future. Our ability to self-regulate may therefore be our most essential asset (Porath & Bateman, 2006). Self-reflective and self-reactive capabilities enable us to exercise a degree of control over our feelings, thoughts and actions. The process of cognitively representing conceived future events in the present stimulates behavioural regulators which can instigate self-directed change. Through the exercise of forethought, people can set goals, form expectations about what they can achieve, and motivate themselves to take actions in a proactive anticipatory way (Bandura, 1991).

The casual agency in self-directed change lies in the forethought whereby self-regulatory mechanisms guide and incentivise purposive action. Humans are therefore capable of exercising influence and self-directedness over their behaviour, depending on the interplay with the external environment and the standards of behaviour they observe around them. In the psychological literature, self-regulation at the individual level refers to processes carried out to monitor and evaluate one’s own performance in relation to progress towards a given goal (Hogarth, Gibbs, McKenzie, & Marquis, 1991; Kanfer & Ackerman, 1989). According to control theory, if an obstacle is encountered during the pursuit of a goal, this interruption triggers the individual to reassess their situation (Carver & Scheier, 2000). Such processes typically include identification of errors, co-ordinating one’s actions, gaining knowledge about one’s task environment and reviewing one’s progress towards goal attainment (Hogarth et al., 1991; Kanfer & Ackerman, 1989; Karoly, 1993). However, success at self-regulation depends to some extent on whether a person pays attention to their own performances (Bandura, 1991). Indeed, people cannot influence their actions very well if they do not have an idea about how well they have performed, under what conditions, and what consequences their performance might have. Such self-observation is crucial if one is to set realistic goals

and evaluate to what extent they have progressed towards them. Reasons for differences in self-monitoring orientations have been linked to social identity; people who have a strong sense of identity are more oriented towards fulfilling their personal expectations and standards, and therefore display higher levels of self-directedness (Snyder, 1987). A similar hypothesis can also be drawn at the group level of analysis, whereby teams which have strong collective group identification are more likely to show concern for meeting expected standards of group performance, and will therefore engage in deeper and more frequent self-regulation to direct their future behaviours. Indeed, considering such phenomenon at high levels is important, given that '*many human endeavours are directed at group goals that are achieved in organisational structures through socially mediated effort*' (Bandura, 1991; pp. 265).

If, as Archer (2007) argues, much of an individual's behaviour is purposive and governed by forethought, then given that groups are composed of a collection of individuals behaving together, it can be conceived that a similar equivalent must be operating at the group level, orchestrating team level processes. In conceptualising self-regulation theory at the team level of analysis, it is arguable that from this theoretical perspective teams are only real teams in the extent to which they collectively regulate their behaviour and continuously talk about what they are doing as a team. This requires that they observe and reflect upon their performance and processes, and implement appropriate self-directed change. Indeed, Kozlowski et al. (1996) extended self-regulation to the team level, arguing that a team's self-regulatory capacity can increase through the development of shared perceptions between team members about the team and its environment. They argue that '*team self-regulation involves an understanding of how to coordinate member actions, engage in error detection, and monitor each other's performance, so the team can balance workloads and stay on track toward stated objectives*', (p. 276), thus making explicit the composition linkages between the individual and team levels (cf. Chan, 1998).

Self-regulating work groups are a direct development and valuable contribution of socio-technical systems theory (Cummings, 1978; Lewin, 1951; Trist, 1981). Socio-technical systems theory suggests that the primary mechanism by which group task design influences outcomes is through team self-regulation (Cohen, 1993). Indeed, the idea underpinning the concept of self-regulating work groups was to design effective relationships between the technical and social components of a task environment, whereby group members are afforded sufficient autonomy to exercise self-regulation and take internal control of their work structure. This allows the actors closest to sources of uncertainty and challenge to take action,

as opposed to relying on external control mechanisms to make decisions (e.g. senior managers), which because of their positioning, inherently have less influence over and understanding of such factors. This degree of autonomy that a team has in decision making makes it important and meaningful to reflect upon and discuss their current effectiveness of work routines and how they could be improved (Brav, Andersson & Lantz, 2009). As is argued by Anotni (2005) '*self-regulation is not an end in itself but rather a means to shorten feedback loops in order to be able to adjust faster to changing internal and external demands.* (p.174)' Real teams are able to exercise a degree of self-regulation, and therefore have the freedom to engage in teamwork behaviours such as reflexivity in order to improve their performance strategies.

Self-regulation theory is also relevant for thinking about goal setting at the group level. As shall be discussed in more detail later in this chapter, goal setting theory (Locke & Latham, 1990) posits that goals serve as immediate regulators of action, and represent an end state towards which an individual or team strives (Erez & Kanfer, 1983). Research into goal-setting has frequently found that challenging goals lead to higher levels of performance than do vague or easy goals (Locke, Shaw, Saari, & Latham, 1981). However, the simple adoption of a goal or objective, regardless of how challenging it is, has no lasting motivational effect if one does not know how well they are progressing towards it (Bandura & Cervone, 1983). Thus, at a team level, shared objectives which are established through a common work approach will only have the effect of motivating co-ordinated and interdependent action if a team engages in constant self-regulation to review their progress towards the objectives. Although self-regulation at the individual level may typically exist as 'internal conversations' in one's thought processes (Archer, 2007), the social interaction required for teamwork means that self-regulation becomes conscious and explicit in the communication between team members. Further, team self-regulation comprises of both psychological aspects (a teams shared cognition relating to the team task and team processes) and behavioural aspects (actual time spent reflecting on processes and performance during team meetings).

Overall, self-regulation theory provides a useful and novel theoretical perspective for understanding what constitutes a real team in today's organisations. As shall be discussed in the subsequent sections of this chapter, the inclusion of two real team characteristics, namely reflexivity and autonomy, can be understood and justified when considering insights from this third theoretical perspective. The inclusion of shared objectives can also be somewhat linked to self-regulation theory.

### **4.3.2 Content analysis of existing definitions**

Having outlined the three key theoretical perspectives which will guide the conceptualisation of real teams in this thesis, the following section takes a closer look at specific definitions of teams which have been put forward in the literature in order to delineate the more specific characteristics which define real teams. Whilst reviewing the literature around the teams, it was evident that various theories of team taxonomies have been put forward, with the focus being on in what ways teams differ from one another (Cohen & Bailey, 1997; Devine, 2002; Sundstrom, 1999). Mathieu et al. (2008) also highlight the variety of forms in which teams can exist, and discuss how different types of teams face different demands and therefore function quite differently. Some teams are composed of functionally homogeneous members and operate in stable environments, whereas others are short lived and flexible in terms of their membership, structure and tasks. Despite these substantive differences, I propose that work teams in organisations still tend to share a number of fundamental facets, to greater or lesser extents, allowing for the development of a generic model of real teams. Therefore, following the broad review of the theoretical perspectives which can underpin the real team construct (see previous section), a more focused review of team definitions was carried out in order to identify the specific facets or characteristics of real teams.

A comprehensive content analysis of existing definitions of a team was conducted in order to identify the most frequent occurring team features. Table 4.1 lists a number of commonly accepted and frequently cited team definitions. Although the list presented here is not completely exhaustive (partly due to space constraints), it is highly encompassing. Less commonly used definitions were also incorporated into the content analysis in order to capture the full array of conceptualisations. I firstly identified these definitions through my reading of the team literature, after which a web search in Google Scholar and other online journal resources (e.g. EBSCO, Science Direct, Web of Knowledge) was conducted using key phrases such as ‘team’, ‘work group’, ‘team/work group definition’ or ‘definition of a team/work group’ to identify any further definitions. After compiling a copious list of team definitions, I content analysed the definitions according to the most commonly occurring themes. The themes identified from the existing conceptualisations of real teams (see section 4.2.2) were used as an initial framework for coding the definitions. However, with the aim of extending existing conceptualisations to create a more parsimonious model, the researcher allowed other themes to emerge.

**Table 4.1: Content analysis of team definitions**

Author (year)	Conceptual definition of a group or team	Key themes
Alderfer (1977; p.230)	‘A human group is a collection of individuals (1) who have significantly interdependent relations with each other, (2) who perceive themselves as a group by reliably distinguishing members from non members, (3) whose group identity is recognized by non-members, (4) who, as group members acting alone or in concert, have significantly interdependent relations with other groups, and (5) whose roles in the group are therefore a function of expectations from themselves, from other group members, and from non-group members.’	Interdependence Boundedness Specified roles
Anderson & West (1998; p. 236).	<i>A proximal work group is a</i> ‘permanent or semi-permanent team to which individuals are assigned, whom they identify with, and whom they interact with regularly in order to perform work-related tasks.’	Boundedness
Cohen & Bailey (1997; p.241)	‘A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries.’	Interdependence Boundedness
Devine, Clayton, Phillips, Dunford & Melner (1999; p.681)	‘A collection of three or more individuals who interact intensively to provide an organizational product, plan, decision, or service.’	Interdependence
Francis & Young (1970; p.8)	‘An energetic group of people committed to achieving common objectives and producing high quality results.’	Shared objectives
Gladstein (1984; p.502)	‘Organizational teams - defined as a set of interdependent individuals who view themselves as a group and perform a task defined by the organization.’	Interdependence Boundedness
Guzzo & Dickson (1996; p.309)	‘A “work group” is made up of individuals who see themselves and are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems (e.g. community, organization), and who perform tasks that affect others (such as customers or coworkers).’	Boundedness Interdependence
Hackman (1990; p.4)	<i>Work groups are</i> ‘intact social systems, complete with boundaries, interdependence among members, and differentiated member roles.’	Boundedness Interdependence Specified roles
Hackman (2002; p.41)	‘Real work teams in organizations have four features: a team task, clear boundaries,	Shared objectives

	clearly specified authority to manager their own work processes, and membership stability over some reasonable time period.'	Interdependence Boundedness Autonomy
Hollenbeck et al. (1995; p.293)	'Groups such as these are best characterized as teams, rather than as sets of independent decision makers, for several reasons. First, these individuals are highly interdependent. Each is dependent on others for important information related to the team's success. Second, the members have a common goal and a common fate. The team's success or failure directly affects the individuals' own outcomes. Third, members of the team influence each other in the course of making a decision.'	Interdependence Shared objectives
Katzenbach & Smith (1998; p.45)	'A team is a small number of people who complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.'	Shared objectives
Kazemak & Albert (1988; p.109)	'having a clear and common purpose and their members having an understanding of their interdependence on one another.'	Shared objectives Interdependence
Kozlowski and Bell (2003; p.3)	'[A <i>team is</i> ] composed of two or more individuals who interact socially, share one or more common goals, exist to perform organisationally relevant tasks, exhibit task interdependencies, manage and maintain boundaries, and are embedded in organisational context that constrains the team, sets boundaries, and influences the team's exchanges with other units in the broader entity.'	Shared objectives Interdependence Boundedness
Kozlowksi & Ilgen (2006; p.79)	'A team can be defined as (a) two or more individuals who (b) socially interact (face-to-face or, increasingly, virtually); (c) possess one or more common goals; (d) are brought together to perform organizationally relevant tasks; (e) exhibit interdependencies with respect to work flow, goals and outcomes; (f) have different roles and responsibilities; and (g) are together embedded in an encompassing organizational system, with boundaries and linkages to the broader system context and task environment.'	Shared objectives Interdependence Specified roles Boundedness
Kozlowski et al. (1999; p.245)	'Teams are defined as two or more individuals who socially interact, have one or more common goals, exist to perform task-relevant functions, exhibit workflow interdependencies, and are embedded in an organizational context.'	Shared objectives Interdependence
Lanza, (1985; p.47)	'A group of individuals working together in which individual success is based on group success.'	Interdependence
McGrath et al., (2000, p.95 & 97)	'We view groups as bounded, structured entities that emerge from the purposive, interdependent actions of individuals.' 'Teams...are defined in contrast to groups in general as having a common group goal.'	Boundedness Interdependence Shared objectives

Rasmussen & Jeppesen (2006; p.105)	'The term team refers to (1) a groups of employees that is formally established, (2) which is assigned some autonomy (with different intensities and within different organizational areas), and (3) which performs tasks that require interdependence between members (also with different intensities and areas).'	Boundedness Autonomy Interdependence
Rousseau et al., (2006; p.541)	'A work team is defined as any formal and permanent whole of at least two interdependent individuals who are collectively in charge of the achievement of one or several tasks defined by the organization.'	Boundedness Interdependence Collective task
Salas et al., (1992; p.4)	'A distinguishable set of two or more people who interact dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life-span of membership.'	Boundedness Interdependence Shared objectives Specified roles
Salas et al., (2005; p.562)	'Two or more individuals with specified roles interacting adaptively, interdependently, and dynamically toward a common and valued goal.'	Specified roles Interdependence Shared objectives
Salas et al., (2007; p.189)	'We define a team as follows: it is a complex entity consisting of (1) two or more individuals (2) who interact socially and (3) adaptively, (4) have shared or common goals, and (5) hold meaningful task interdependencies; it (6) is hierarchically structured and (7) has a limited life span; in it (8) expertise and roles are distributed; and it is (9) embedded within an organizational/environmental context that influences and is influenced by ongoing processes and performance outcomes.'	Reflexivity Shared objectives Interdependence Specified roles
Schippers et al., (2007; p.194)	'Drawing on Hackman (1987) we considered teams to be composed of individuals who both see themselves and are seen by others as an interdependent social entity. Teams are embedded in a larger organisation, and their performance affects others, for instance suppliers or customers.'	Interdependence Boundedness
Shea & Guzzo (1987; p.25)	'[A work group is] a set of three or more people that can identify and be identified by others in the organization as a group.'	Boundedness
Sherif & Sherif (1969; p.131)	'A group is a "social unit characterized by members who have role and status relative to their position in the group and whose behavior is influenced by shared norms and values at least in matters of consequence for the group.'	Specified roles
Sundstrom et al., (1990; p.120)	'A small group of individuals who share responsibility for outcomes for their organizations.'	Shared objectives
Wageman et al., (2005; p.377)	'Real teams have three features. First they have clear boundaries that reliably distinguish members from nonmembers. Second, team members are interdependent for some common purpose, producing a potentially assessable outcome for which members	Boundedness Interdependence Shared objectives

	bear collective responsibility. Finally real teams have at least moderate stability of membership, which gives members time and opportunity to learn how to work together well.'	
West (2004; p.18)	'Groups of people embedded in organisations, performing tasks that contribute to achieving the organisations goals. They share overall work objectives. They have the necessary authority, autonomy, and resources to achieve these objectives. Their work significantly affects others within the organisation. Team members are dependent on each other in the performance of their work to a significant extent; and they are recognised as a group by themselves and by others. They have to work closely, interdependently, and supportively to achieve the team's goals. They have well-defined and unique roles. They are rarely more than 10 members in total and they are recognised by others in the organisation as a team.'	Shared objectives Autonomy Interdependence Boundedness Specified roles
West et al., (1998; p.123)	Members of a group have shared objectives in relation to their work. Necessarily they must interact with each other in order to achieve those shared objectives, Team members have more or less well-defined and interdependent roles, some of which are differentiated from one another...and they have an organisational identity as a work group with a defined organisational function.	Shared objectives Specified roles Interdependence Boundedness
Zander (1977; p.6)	'A group is a collection of individuals who are interdependent to some degree.'	Interdependence

Five common codes initially emerged as occurring most frequently. As can be seen in table 4.1, these were labelled as shared objectives, interdependence, autonomy, boundedness and specified roles. As already alluded to, Hackman's (2002) conceptualisation of real teams had a considerable influence on the development of the model at hand, with dimensions of interdependence, autonomy and boundedness all being incorporated. Indeed, interdependence was an overriding theme referred to in some way or another in all of the team definitions reviewed. Autonomy also featured as a key structural characteristic of teams (Campion et al., 1993; Hackman, 1986; Langfred, 2005; 2007). Other themes that frequently occurred throughout the review processes included defining or specified team member roles (Gully, 2000; West, 2004; Hackman & Wageman, 2005; Salas et al., 2005; Salas et al., 1992) and a shared objective or common purpose (Parker, 1990; Kozlowski & Bell, 2003; West, 2004; Hackman 2002; Hackman & Wageman, 2005; Sundstrom et al., 1990; Salas et al., 2005; Rousseau et al., 2006; Katzenbach & Smith, 1998; Salas et al., 1992). These five criteria were therefore incorporated into the theoretical model.

However, in order to extend existing approaches and reliably represent and capture real teams in today's ever more complex and challenging organisational environments, a final criterion was included which was derived from West's (1996; 2000) model of team reflexivity. Although this dimension did not explicitly appear in the existing team definitions presented earlier, the related constructs of adaptability and self-regulation occur more subtly within the literature on teams. For example, Kozlowski and Ilgen (2006) state that '*teams are complex and dynamic systems that exist in a context, develop as members interact over time, and evolve and adapt as situational demands unfold*' (p.78). Similarly, in Salas et al. (2007) definition of a team – notably one of the most recent definitions available (see table 4.1), teams are defined as those which '*interact socially and adaptively*' (p. 189). Adaptability is a central teamwork process in the 'Big Five' model of team effectiveness recently proposed by Salas et al. (2005). The notion of adaptability also appears in other teams definitions (e.g. Salas et al., 1992). In a review of the team effectiveness literature, Ilgen et al. (2005) confirm that '*conceptually, team researchers have converged on a view of teams as complex, adaptive, dynamic systems*' (p.519; also see McGrath et al. 2000).

With reference to the underpinning theoretical perspectives of the real team model, self-regulation theory posits that such adaptability can only occur if teams self-regulate their processes and performance. I propose that in practice, such adaptability manifests itself in the team process of reflexivity. Reflexivity is considered as a vital self-regulatory process that

teams must engage in if they are to be able to review their objectives, processes and strategies and as a result adapt their performance to meet their goals.

The inclusion of both input (autonomy, boundedness and specified roles) and process (shared objectives, interdependence and reflexivity) criteria in the real team model serves to further extend original conceptualisations of real teams, such as Hackman's (2002), which traditionally only focus on team inputs (see I-P-O model in chapter 2). By incorporating team processes into the real team construct, it is argued that real teams are in fact fluid self-regulating entities that are capable of adapting over time, as opposed to rigid entities whose fate is already determined by input factors and wider organisational constraints in the external environment. This revised conceptualisation is consistent with the view that teams are adaptive and dynamic entities (Kozlowski & Ilgen, 2006; McGrath et al., 2000).

#### **4.3.3 An integrative theoretical framework of real teams.**

As no single existing conceptualisation of real teams provides a sufficient level of comprehensiveness, relevance and parsimony that is needed for researching teams in today's organisations, I propose an extended theoretical model of real teams. Based on the six real team criteria established in the previous section, I suggest that a real team can be defined as:

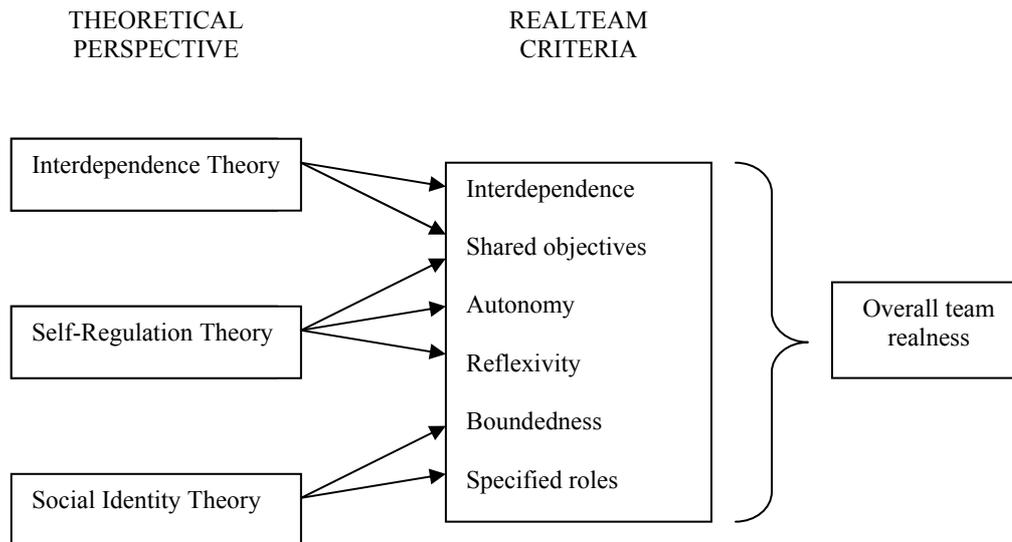
*'A group of people working together in an organisation who are recognised as a team; who are committed to achieving clear team-level objectives upon which they agree; who have to work closely and interdependently in order to achieve these objectives; whose members are clear about their specified roles within the team and have the necessary autonomy to decide how to carry out team tasks; and who communicate regularly as a team in order to regulate team processes.'*

Following this definition, a team is a 'real team' when team members work closely and interdependently together towards clear shared objectives which team members agree upon and are committed too. Real teams engage in regular self-regulation during which they reflect upon their effectiveness and how this could be improved in future. They also have a degree of autonomy to manage their own work processes and determine their course of action, and therefore implement changes to improve their performance. Finally, team members are clear about what their specific roles are within the team, as well as the roles of other team members.

## 4.4 THE REAL TEAM MODEL

A theoretical model for defining real teams is presented below (see figure 4.1). Each of the real team criteria anchor at ends of a continuum that distinguishes real teams from pseudo teams. Each real team criteria will now be discussed in turn, with regards to the theory and research that underpins its inclusion in the real team model.

**Figure 4.1: A theoretical model of the criteria of real teams**



### 4.4.1 Interdependence

Interdependence has become one of the most important topics in current small group and team research (Barrick et al., 2007). As is evident in the content analysis of existing team definitions, within-team interdependence is widely considered as a fundamental defining characteristic of teams (DeChurch & Mesmer-Magnus, 2010; Kozlowski & Bell, 2003, Ilgen et al., 2005; Stewart & Barrick, 2000) and tends to be the main reason why teams are formed in the first place (Mintzberg, 1979). Under conditions of no interdependence, a task can be completed entirely by one individual (Wageman & Gordon, 2005). However, teams are necessary when the specific task to be performed cannot be achieved by individuals working in isolation. Because interdependent tasks can be completed more efficiently by teams, interdependence is related to team effectiveness. (Kozlowski & Bell, 2003). The notion that various aspects of team interdependence, including collective tasks, goals, outcomes and rewards, are key determinants of team effectiveness is present in many lines of theory and research, including Socio-Technical Systems Theory (Cummings, 1978; Lewin, 1951; Trist, 1981) and Input-Process-Output Models (Gladstein, 1984; Hackman, 1987). Consequently, it

is argued that small-group and team research which fails account for interdependence is of limited value for developing our understanding of team effectiveness (Kozlowski and Bell, 2003). Traditionally, many researchers have considered interdependence as a team input with regards to the IPO model (see chapter 2), given that it is in part determined by the design features and constraints of the technology of a task (Goodman, 1986). However, interdependence has also been conceptualised as a process, given that it reflects the way in which a team chooses to interact, coordinate and execute its task (Saavedra et al., 1993). In line with the social psychological conceptualisation of interdependence (see section 4.3.1.1) this second approach will be followed here.

The theme of interdependence primarily originates from the work of Guzzo and Shea (1992; Shea & Guzzo, 1987) and essentially describes the degree to which contextual factors, external of an individual and his or her behaviour (i.e. goals, tasks and outcomes) determine the collective relationship between entities, so that each entity affects and is affected by another (Barrick et al., 2007; Campion et al., 1993; Stewart & Barrick, 2000; Wageman, 2001). Interdependence therefore defines the extent to which members of a team must work interactively and cooperatively in order to successfully complete a task (Stewart & Barrick, 2000). Thus, when team members demonstrate cooperation and a dependency on one another for information, reciprocal inputs and resources, the team itself can be described as highly interdependent (Campion et al., 1993; Emery & Trist, 1969). A deeper investigation into the literature uncovers a number of interdependence typologies, namely task, goal and outcome interdependence. Although in practice they are difficult to disentangle, it has been proposed that task, goal and outcome interdependence are conceptually distinct (Campion et al., 1993; Gully, Incalcaterra, Joshi, & Beaubien, 2002; Wageman 2001). Therefore, each will briefly be discussed in turn.

#### ***4.4.1.1 Task interdependence***

According to Shea and Guzzo (1987), task interdependence describes the degree of task-driven interaction among team members. In other words this is the extent to which team members depend on one another for both individual and team task completion. Task interdependence is not only determined by the characteristics of the team task, but also the extent of discretion that team members exercise in establishing the level of interaction and cooperation required for effective performance (Shea & Guzzo, 1987). Task interdependence has frequently been defined as a team-level characteristic (e.g. Campion et al., 1993; Campion, Papper & Medsker, 1996; Guzzo & Shea, 1992; Saavedra et al., 1993), as well as a

structural property of the instrumental relations which exist between team members (Van der Vegt, Emans, & van de Vliert, 2001). In line with the re-conceptualisation of real teams proposed here, organisational scholars have suggested that groups and teams can distinguished as existing on contrasting ends of a continuum of task interdependence (Kozlowski et al., 1999; Morgan et al., 1986; Salas et al., 1992).

Task interdependence is evident when the successful completion of a task requires that team members share information, expertise and resources effectively, in order to meet their desired outcome (Cummings, 1978). The extent of task interdependence typically increases when tasks themselves become more difficult (Van de Vegt, et al., 2001), for example when the task moves from being pooled to sequential or sequential to reciprocal in nature (Thompson, 1987). When the level of task interdependence is low, the need for team members to interact with one another in order to attain their goals is also low; consequently, teamwork behaviours are required to a lesser extent (Rousseau et al., 2006). Conversely, when task interdependence is high, the teams work must be arranged so that team members' co-ordinate their efforts, interact frequently and closely, and exchange resources in order to accomplish their task (Tesluk, Mathieu, Zaccaro, & Marks, 1997; Wageman, 1995, 1999). Further, throughout the period of the task, activities and sub-tasks must constantly flow between team members in a back-and-forth manner (Van de Ven, Delbecq, & Koenig, 1976). Thus, overall team performance is a function of a complex and multifaceted amalgamation of team members' inputs (Rousseau et al., 2006). The main effect of task interdependence on team processes has been demonstrated in a number of studies (Crawford & Haaland, 1972; Earley & Northcraft, 1987; Miller & Hamblin, 1963; Stewart & Barrick, 2000, Wageman, 1995). Task interdependence has also been shown to moderate the relationship between team processes and team performance (Miller & Hamblin, 1963; Saavedra et al., 1993).

#### ***4.4.1.2 Goal interdependence***

Goal interdependence refers to the degree to which a team is assigned a number of clearly defined objectives or a collective purpose which guide their efforts and performance, and for which all team members are responsible. (Gully et al., 2002; Johnson & Johnson, 1989; Saavedra et al., 1993). Collective goals are thought to directly affect the way in which team members self-organise in teams (Gully et al., 2002) and have been shown to impact on work team effectiveness (Campion et al., 1993, Campion et al, 1996).

Wageman (1999) regards goal interdependence as a function of how overall performance is assessed, whether this is by team performance, individual performance, or a sum of the two. For optimal team performance, it is crucial that goals not only exist for all individual team members, but that these goals are aligned with the wider collective goals of the team (Campion et al., 1993). Indeed, research has shown that collective goals not only facilitate the development of collective team strategies but also affect collective performance, particularly when task interdependence is high (Crown & Rose, 1995; Gully et al., 2002; Mitchell & Silver, 1990). Although the consideration of goal interdependence is relevant for discussion here, it also somewhat overlaps with the next real team criteria that will be discussed, which is shared objectives.

#### ***4.4.1.3 Outcome interdependence***

Outcome interdependence has been defined as the extent to which significant outcomes received by an individual are dependent on the performance of others (Wageman, 1995). Outcome interdependence in teams is evident when the accomplished output of the team task is contingent on collective performance and has shared significant consequences for some, or all of the team members (Shea & Guzzo, 1987; Wageman, 1995). It is well documented that feedback is an important and motivating job characteristic (Hackman & Oldham, 1980) although less is known about how it works at a team level. However, Shea and Guzzo (1987) argue that no team can sustain effective performance in the absence of outcome interdependence.

Research has shown that shared outcomes, such as team-based rewards, are likely to foster a team spirit and help team members to recognise the importance of their personal contribution to the team's success (DeMatteo, Eby, & Sundstrom, 1998; Mohrman et al., 1995; Snell & Dean, 1994). Collective outcomes also encourage group-orientated behaviour in which team members are motivated to cooperate and assist one another in completing tasks, thus enhancing overall team effectiveness (Gully et al., 2002). In a recent study De Dreu (2007) incorporated the concept of outcome interdependence with the theory of cooperation and competition (Deutsch, 1949, 1973; Johnson & Johnson, 1989; Tjosvold, 1998). Under conditions of cooperative outcome interdependence, teams exhibit high levels of psychological safety, pro-social motivation and trust, and deal with conflict in a constructive and beneficial way (De Dreu, 2007; Stanne, Johnson, & Johnson, 1999; Tjosvold, 1998; Wong, Tjosvold, & Yu, 2005), where as the opposite is true for teams operating under conditions of competitive outcome interdependence. Cooperative outcome

interdependence is therefore important in teams, as it fosters information sharing, learning and systematic information processing, particularly when task reflexivity is high (De Dreu, 2007). Indeed, reflexivity is another defining characteristic of real teams which will be discussed later in this chapter.

Overall, despite the conceptually different forms of interdependence that have been outlined, empirical evidence has demonstrated that task, goal and outcome interdependence combine to form an overall composite measure of interdependence (Campion et al., 1993, Campion et al., 1996; Gully et al., 2002). This makes intuitive sense as in reality, task, goal and outcome interdependence rarely exist in isolation. For example, a team of students who are working together on a business game simulation will have to combine their knowledge skills and abilities in order to successfully execute the multiple interdependent assignments that the task demands (e.g. financial calculations, marketing tasks, human resource decisions). Given that the success of each sub-task is dependent on the completion of others, the team is also likely to share a number of interdependent goals (e.g. to gain competitive advantage, be the most successful team, or receive a high collective mark). As a team, members are also likely to reap significant interdependent outcomes. Therefore, task, goal and outcome interdependence collectively influence the extent to which team members must work together to perform effectively and should therefore be considered as one overall construct.

With regards re-conceptualising real teams, a team can only be a real team if they are given a task which requires ‘team work’ (Hackman, 2002) and recognise the need for interdependent working (in terms of tasks, goals and outcomes). Indeed, without a sufficient degree of team interdependence, the true benefits of teamwork will not be realised as there would be no collaborative opportunity for team members to actively synthesise their diverse range of knowledge, skills and abilities in a collective and co-ordinated manner.

#### **4.4.2 Shared objectives**

The incorporation of this second dimension into the real team model not only stems from the frequency with which it explicitly occurred in the content analysis of existing team definitions, but is also underpinned by the theoretical perspectives discussed in section 4.3.1, most notably by interdependence theory. From the perspective of interdependence theory, real teams operate under conditions of cooperative goal interdependence, whereby team members perceive their goals to be positively interrelated and shared. A shared group identity will facilitate the development of and commitment to a shared vision, underpinned by a number of

specific collective goals. Further, processes of team self-regulation are directly targeted towards the assessment and achievement of these goals, to ensure that they are still aligned with the evolving environment. There are a number of important reasons why real teams have shared objectives, each of which will now be discussed.

A basic assumption of teams is that they are goal-orientated (Wittenbaum et al., 2004) and therefore need clear shared objectives. It is widely accepted that goals and objectives play a significant role in shaping behavioural patterns and the benefits of individual goal setting are well documented in the literature (Locke & Latham, 1990). Goal setting theory is based on the assumption that goals serve as immediate regulators of action, and represent an end state towards which an individual or team strives (Erez & Kanfer, 1983). Just as individual goals can promote task strategies that optimise individual performance, team level goals can facilitate the development of cooperative strategies (Gully et al., 2002). Indeed, a study by O’Leary-Kelly, Martocchio and Frink (1994) found a significant difference in performance between teams with a goal, compared to teams without a goal.

A key facet of real teams is the shared objective that unites team members. Team level objectives, which include a clearly defined purpose or mission statement, are thought to be critical to team effectiveness and performance (Gladstein, 1984; Guzzo & Shea, 1992; Hackman, 1987; Hackman & Walton, 1986; Sundstrom et al., 1990). Team level objectives give team members the incentive to combine their efforts and collaborate closely in their work together (Weldon & Weingart, 1993). Effective goal setting behaviour in teams not only helps team members to realise their goal interdependence, but has also been shown to improve and sustain higher performance, motivation and team member satisfaction (Rogers & Hunter, 1991). The nature of this sub-dimension of real teams is closely related with team interdependence, specifically goal interdependence, as all team members must work in a timely and co-ordinated fashion towards the achievement of a common objective for which they are held mutually accountable. According to West (2004), teams are effective when they have team level objectives which are not only shared, but are also clear, agreed upon by team members, and to which the team is committed.

#### ***4.4.2.1 Clarity of objectives***

When a team understands the demands of their task, the generation of a clear mission statement, consisting of a number of specific and carefully stipulated objectives ensures that all team members share the same vision for their team and clearly understand the objectives

by which it can be accomplished (Rosseau et al., 2006). A clear objective should incorporate specified goals which are connected to the purpose of the team and specify the level of performance that team members are expected to achieve (Weldon & Weingart, 1993). However, as is common in teamwork, people often interpret information and events differently, which can lead to confusion and disorganised responses (Kozlowski et al., 1999). If team members are uncertain about what the values, goals and orientations of their colleagues are, it is unlikely that the team as a whole will be able to articulate a clear vision which encapsulates a number of clear and shared objectives (West, 2004). This is also difficult when ambiguity surrounds the task that the team must perform. The presence of unclear, ill-defined goals (or no goals at all) has been shown to be detrimental for team performance (Weldon & Weingart, 1993). Teams are comprised of a collection of individuals, each with their own cognitions, emotions, goals and motivations. Clearly articulated shared objectives therefore serve to unite team members in striving towards a common purpose, facilitating the development of shared mental models. Shea and Guzzo (1987) found that in clearly defining team goals, members were more able to focus and recognise their interdependence. Studies have also shown that group goals raise member effort (Weingart & Weldon, 1991). Indeed, research into goal-setting has frequently found that challenging goals lead to higher levels of performance than do vague or easy goals (Locke et al., 1981). However, clear objectives will only improve team performance if team members also fundamentally agree upon them and are committed to achieving them (Hollenbeck & Klein, 1987).

#### ***4.4.2.2 Agreement upon objectives***

Goal-setting theory states that specific, challenging and accepted goals can regulate human action and have the leverage to motivate, direct and energise behaviour (Locke & Latham, 1990, 2002). Therefore, not only should team objectives be clear and interdependent in nature, they should also be agreed upon by all team members. Goal agreement is an important aspect of goal setting principles which might easily be neglected or overlooked in teams, particularly when task requirements are ambiguous or goal difficulty is high. Indeed, when group and individual goals conflict, problems are likely to manifest themselves in team processes. Further, dysfunctions can result if there are discrepancies between individual and team objectives (Guzzo & Dickson, 1996). Potential mediators of the effects of team objectives include the extent of communication and cooperation fostered in teams (Weldon & Weingart, 1993). Thus, the generation of clear team objectives requires the communication

and consideration of each team members individual work values and orientations, in order that they are acknowledged and appropriately aligned with team level goals (West, 2004).

#### ***4.4.2.3 Commitment to objectives***

Locke, Latham and Erez (1988) argue goal setting will not work without commitment to goals. A goal that a team *'is not really trying for is not really a goal and therefore cannot have subsequent action'* (Locke & Latham, 1990; p.124). Goal commitment is therefore crucial for goal setting at the team level (Antoni, 2005). Goal commitment refers to one's determination to reach a goal (Klein, Wesson, Hollenbeck & Alge, 1999) and has specifically been defined as the extent to which an individual or a team *'considers the goal to be important, is determined to reach it by expanding effort over time, and is unwilling to abandon or lower the goal when confronted with setbacks or negative feedback'* (DeShon & Landis, 1997; p.106).

In assessing goal commitment, one should not assume that just because team members have agreed and accepted team objectives, that they are necessarily committed and psychologically bound to them (Hollenbeck, Klein, O'Leary & Wright, 1989). Goals and objectives must be achievable, attractive and meaningful (Millward, Banks & Riga 2010). Although the antecedents and effects of goal commitment remain unclear (Tubbs, 1993; Antoni, 2005), it has been suggested that incentives, which are likely to be reflected in outcome interdependence, can increase goal commitment (Knight, Durham & Locke, 2001). Challenging yet realistic goals are also likely to increase a team's commitment towards achieving its objectives (Knight et al., 2001). Team members are also more likely to demonstrate commitment towards achieving their goals if they develop a shared sense of the motivating value for their work (West, 2004). Research has shown that team loyalty, effort and commitment can all be fostered when the overall team vision reflects the true underlying values of the team (Locke, et al., 1981; Locke & Latham, 1990). Indeed, team members who are committed to their team's objectives are more likely to persist completing their individual tasks, as well as assisting other team members. Such commitment demonstrates a desire to continue functioning as a team, thus enhancing team viability in the long term.

Overall, part of what defines a real team is a shared objective. Thus, the extent to which teams have shared objectives will determine the extent to which they advance up real team continuum. Most crucially, not only should team objectives be clearly articulated, team members should also be in agreement in terms of what the objectives should achieve. Further,

successful execution of tasks and completion of team objectives will require a degree of commitment from team members, to ensure that each member contributes to the overall task in an appropriate way. The factors of sharedness, agreement and commitment therefore all serve to capture the dimension of shared objectives in the real team model.

#### **4.4.3 Team reflexivity**

Self-regulation theory suggests that real teams should not be conceptualised as static entities. Nor do they exist in a vacuum. Work teams are complex systems that exist over time, and across boundaries, constantly adapting and evolving in accordance to the outside environment (Kozlowski & Ilgen, 2006). In order to understand what they need to achieve, teams need to understand how they are already doing, and how this is affected by their own processes as well as the environment surrounding them. Just as the behaviour of individuals is regulated by forethought, the behaviour of a team is also purposive, ensuring that the team stays on track towards its objective (Kozlowski et al., 1996). Without a degree of self-regulation, teams would simply stand still. As was discussed earlier in section 4.3.2, it is only recently that teams have been acknowledged as adaptive systems (Kozlowski & Ilgen, 2006). Such characteristics are certainly missing from existing definitions of real teams. Therefore, the new definition of real teams presented in this thesis aims to extend existing definitions to incorporate the theme of self-regulation. This is captured through the inclusion of team reflexivity in the real team model.

The basis for human self-motivation relies on both discrepancy production as well as discrepancy reduction (Bandura, 1991). Reflexivity allows one to identify discrepancies between where one is currently performing and where one should be. Team reflexivity is the extent to which members of a team overtly and collectively reflect upon their immediate and long term objectives, processes and strategies and adapt them to current or anticipated circumstances (Carter & West, 1998; West, 1996, 2000, 2002). Reflexivity in teams is the higher level equivalent to reflective thinking and meta-cognition at the individual level (Ericsson & Lehmann, 1996; Schön, 1983). The processes of reflecting on objectives and monitoring progress and strategies facilitates adaption, form the basis for learning and performance in complex tasks (Gurtner, Tschan, Semmer & Nägele, 2007; West 1996). Struggling to co-ordinate efforts, overcoming task-related frustrations and dealing with interpersonal tensions are all part and parcel of working in a team, given that teams are typically given tasks that are too complex to be carried out by individuals working alone. However, under high levels of reflexivity, team members are motivated to engage in deep and

systematic information processing which helps them to combine and integrate relevant information to formulate creative problem solutions and improved ways of completing their tasks (De Dreu, 2007). By reflecting upon strategies, task objectives and processes, reflexive groups can plan ahead, actively structure situations, have a better knowledge of their work and can anticipate errors. Reflexivity is particularly useful for teams working in complex environments on difficult tasks as it helps them to recognise whether the way in which they are currently working corresponds with emerging challenges and external conditions. Deliberate reflection and discussion on anticipated changes can prompt teams to actively develop improved understandings and methods for the future. If teams are able to build self-awareness and monitor how members interact and work with one another, it is more likely that they can recognise areas that need attention and development and implement improvement plans accordingly (Tjosvold et al., 2004).

Hackman (1987) states that team processes are affected by a team evaluation of their collective performance, which impacts on team performance in the future. Evidence has shown that teams which take time out to reflect on their objectives, strategies and processes are more effective than those that do not. In a longitudinal research study, Carter and West (1998) monitored the performance of nineteen BBC TV production teams over a year and found that reflexivity was a significant predictor of the creativity and team effectiveness (measured by audience viewing figures). Reflexivity during regular face-to-face meetings is therefore a fundamental characteristic of real teams and is an overarching factor which can predict team effectiveness (West, 1996, 2004). The team reflexivity process incorporates three key elements; reflection, planning and adaptation. Reflection refers to the awareness, attention, monitoring and evaluation of the object under consideration (West, 2000). Intentions and courses of action are then contemplated and decided upon during the planning phase. Action in accordance to these plans is then required for adaptation. When team planning is characterised by great amounts of detail, hierarchical ordering of actions, including both short and long term plans, and inclusiveness of potential problems, a team is demonstrating high levels of reflexivity. In order to initiate reflexivity, teams must meet together on a regular basis, during which they exchange task-related information. Teams may use a variety of different methods to transmit information, such as scheduled meetings, e-mails, written reports, phone calls or talks in the hallway (Rousseau et al., 2006). However, for the purposes of reflexivity, face-to-face team meetings are likely to be most effective. In a study looking at two different types of communication, Straus and McGrath (1994) found that when group consensus was required, computer mediated groups who used technology as a form of communication did not perform as well as face-to-face groups. Regular face-to-face

meetings will also help to build interpersonal bonds, mutual affective concern and a sense of shared identity which are important climate conditions for reflexivity. Indeed, research into newly formed nursing teams by Edmondson (1996) shows that learning from mistakes and devising innovations to avoid such mistakes in the future can only happen in teams that openly acknowledge and discuss their errors and how they could have been avoided. Therefore, reflexivity requires a high degree of team psychological safety, since reflexive discussions are likely to reveal discrepancies between how the team is and how it should be performing (West, Hirst, Richter & Shipton, 2004).

In summary, existing definitions of real teams do not take into account that teams, by their very nature and purpose, are adaptive and self-regulating entities. If teams have a degree of autonomy over their work (see next section), then they will need to monitor, regulate and control their affect, cognition and behaviour over their lifespan. Given that teams are comprised of individuals, each of whom have their own thoughts, motivations and perceptions, then explicit self-regulatory activity is critical if these team members are to be ‘thinking on the same page’ and coordinating their efforts to the best effect. Thus, engaging in team reflexivity means that a team’s reality is continually negotiated during team interaction (West & Hirst, 2003). Indeed, recent theories have emphasised the importance of shared mental models of shared cognition in effective teams (cf. Mathieu et al., 2000). In practice, this occurs through frequent and thoughtful discussions between team members during which they reflect on their performance and processes. These reflections serve as motivating triggers for future behaviour, and how goals and processes will be adapted to reflect current and anticipated circumstances. Therefore, the degree to which teams report engaging in team reflexivity will partly determine the extent to which they advance up real team continuum.

#### **4.4.4 Team autonomy**

A second real team sub-dimension which is fundamentally underpinned by the self-regulation perspective is team autonomy. As was discussed in section 4.3.1.3, self-regulating or autonomous work teams were a direct manifestation of socio-technical systems approach to management (Cummings, 1978; Emery, 1959; Lewin, 1951; Trist, 1981). From this perspective, the premise of team-based working is to position decision making to the closest possible point of a product or service, whereby a team has sufficient autonomy to exercise self-regulation and take internal control of their work structure. Rather than waiting for decisions to be made by senior management, teams with autonomy at a local level can respond more quickly and effectively to problems in the fast changing environments

encountered by most organisations. Indeed, Cummings (1978) points out that when developing work teams, it is important to provide them with the ability to resolve their own problems.

Following the socio-technical systems movement, autonomy has since been considered as a crucial feature of job design (Hackman & Oldham, 1976; Katz & Kahn, 1978) and has frequently appeared as a key structural characteristic of teams, particularly those explicitly labelled as ‘self-managing’ or ‘autonomous’ teams (e.g. Campion et al., 1993; Hackman, 1986; Langfred, 2005; 2007). According to Langfred (2000) group autonomy can be defined as ‘*the amount of control and discretion the [team] is allowed in carrying out task assigned by the organisation*’ (p.567). Others refer to team autonomy as the extent to which members of a team experience substantial freedom, discretion and independence in their work (Hackman, 1987; Susman, 1976). Overall, team autonomy has frequently been conceptualised as a key characteristic of work teams, describing the extent to which a team’s task provides the team with discretion, independence and substantial freedom to determine procedures and schedule work (Cordery, Mueller, & Smith, 1991; Hackman, 1987, 2002; Kirkman & Rosen, 1999; Langfred, 2000; Van Mierlo, Rutte, Vermunt, Kompier & Doorewaard, 2007). Low levels of autonomy suggest that a task is predominantly structured by people outside of the team, meaning that there is no great need for the team to make collective decisions or manage internal task processes. Conversely, when team autonomy is high, there is a much greater need for team members to engage in collective decision making about their objectives, tasks and processes (Rico, Molleman, Sanchez-Manzanares & Van der Vegt, 2007). In such teams, this enhanced level of decision making means that team members need to interact closely in order to adjust and align their thoughts and behaviours, thus raising their awareness of their interdependence and shared objectives and triggering team reflexivity processes.

It is important to note that team autonomy refers explicitly to the team itself and is not an aggregation of individual autonomy to the team-level (Langfred, 2007). Hackman (1987) describes teams with high levels of autonomy as ‘owning their task’. This is because high autonomy is facilitated through empowering team members with decision-making authority and extensive information, allowing the team to determine its own course of action and heightening an overall sense of determination and internal motivation (Cohen & Ledford, 1994; Spreitzer, 1995; Wall et al., 1986). Teams with high levels of autonomy can also improve their effectiveness via localised adaptation to changes in demands and the wider environment (Manz & Stewart, 1997; Pearce & Ravlin, 1987). As team autonomy increases, team members need to be flexible in regulating and adapting their thoughts and actions, and

must interact closely with team mates to make decisions. In the absence of a hierarchical leader, a team is collectively responsible for their performance (Beekun, 1989) meaning that intra-team cooperation and communication are critical. Teams with high autonomy therefore collectively assume some degree of managerial responsibility (Rousseau et al., 2006). Members of such teams have considerably more freedom and latitude in decision making (Langfred, 2000), particularly with regards to setting team objectives, monitoring team progress and the wider environment, allocating roles, adjusting processes, recruiting new team members or setting priorities (Cooney, 2004; Hackman, 2002; Stewart, 2006). This degree of autonomy to manage their own work processes requires that such teams must demonstrate a wider variety of different teamwork behaviours to ensure that their team objectives are met.

It should be noted that very high levels of autonomy may not be appropriate in all teams (Stewart & Barrick, 2000), particularly those who carry out clearly understood, straightforward and optimised tasks (Manz & Stewart, 1997). In such teams, efficiency and performance are enhanced through hierarchically prescribed instructions in which there is little room for change (Adler & Cole, 1993). Similarly, based on the inherent characteristics of their task, some types of teams, such as research and development teams, may have greater scope for autonomy, than production teams, whose task processes are largely determined by the sorts of technology they use. However, research has argued that the majority of teams will benefit from greater levels of autonomy; evidence has shown that high team autonomy is related to increased innovativeness and job satisfaction, and improvements in productivity and quality, as well as reduced turnover, reduced absenteeism and fewer accidents (Cohen et al., 1996; Goodman, Devadas, & Hughson, 1988; Guzzo & Dickson, 1996; Hackman, 1987; Janz, 1999; Sundstrom et al., 1990). Team autonomy has also been linked with increased work motivation (Janz, 1999; Janz, Colquitt, & Noe, 1997), improved quality of work life (Cohen et al., 1996; Spreitzer, Cohen, & Ledford, 1999), reduced psychological fatigue (Van Mierlo et al., 2001), and reduced job strain (Leach, Wall, Rogelberg, & Jackson, 2005). In accordance to the re-conceptualisation of real teams as continuous, rather than dichotomous concept, collective team autonomy has also been conceptualised along a continuum (Hackman, 1987; Sundstrom et al., 1990), confirming its suitability as a sub-dimension of team realness.

Overall, work teams, by their very premise, should have a degree of autonomy which enables them to set their own objectives and determine aspects regarding the ways in which they carry out their work. A degree of autonomy also allows teams to determine when to review and reflect upon these objectives and processes, and adapt them accordingly. It is

therefore proposed that the realness of teams is enhanced through greater levels of team autonomy. Similarly, Hackman (2002) argues that real teams have some degree of clearly specified authority to manage their own work processes, although this dimension was removed (without explanation) in the later conceptualisation which was operationalised in the Team Diagnostic Survey (Wageman et al., 2005). A team which is characterised by a degree of autonomy not only has the power to execute the team tasks itself, they are also responsible for monitoring and adjusting their own performance to ensure they meet their team objectives (Hackman, 2002).

#### **4.4.5 Team boundedness**

*'Basic to the definition of a work team is the identity of the individuals treated as members by both group and organisation'* (Sundstrom et al., 1990; p.126). They continue by proposing that a work team comprises of an identifiable collection of individuals which is differentiated from its organisational context – this differentiation is what defines the team boundary. The concept of team boundedness has appeared in most well-known definitions of teams in the literature (e.g. Alderfer, 1977; Cohen & Bailey, 1997; Gladstein, 1984; Guzzo & Dickson, 1996; Hackman, 1990, 1992; Kozlowski and Bell, 2003; Kozlowski & Ilgen, 2006), as well as forming a key characteristics of previous definitions of real teams (Hackman, 2002; Wageman et al., 2005; West et al., 1998). According to Hackman (2002), real teams are bounded within their wider environment. In order to work together team members must clearly understand who is in the team. Sundstrom et al. (1990) define boundaries as features that distinguish a team from others (Cherns, 1976); serve as points of exchange with others, such as other teams or entities (Friedlander, 1987); and create either tangible or symbolic barriers to access or exchange people, information or products (Katz & Kahn, 1978). Ancona and Caldwell (1998) define team boundedness as the way in which members are involved in a team; whether they hold a 'core' or 'peripheral' position; whether they work exclusively on the team or also work on for other teams; and whether the team comprises the same members throughout the work cycle. In line with Hackman (2002), the concept of boundedness adopted here refers explicitly to the degree to which team members understand who belongs to the team and who does not, and also the extent to which the team is recognised as a team by the wider organisation within which it is embedded.

The dimension of boundedness in the real team model is directly underpinned by the social identify perspective (cf. Hogg & Terry, 2000; Reynolds, Turner & Haslman, 2000). Boundaries define a team and how it should operate in its context (Sundstrom et al., 1990).

Team members are joined together by perceptual boundaries that distinguish them from other teams and the wider organisational environment (Drach-Zahavy, 2010). Team identification defines the extent to which individuals perceive a sense of 'oneness' with their work team (Gundlach, Zivnuska, & Stoner, 2006). If individuals cannot reliably distinguish between who is in the team and who is not, and there is ambiguity about who shares accountability and responsibility for the completion of the team's task, then a team will not be effective. Process losses, such as diffusion of responsibility, are also likely to occur, as team members will be unwilling to take responsibility in such ambiguous situations. Conversely, members of a bounded team are recognised by the wider environment as a team, identify themselves with that team and are clear about team membership. Because of this, bounded teams can begin to develop the collective momentum, social norms and specialised roles that characterise real teams (Hackman, 2002). Further, members are able to develop a sense of entitativity, which defines the degree to which they see themselves as belonging to one unit (Lickel, Hamilton, & Sherman, 2001). Feelings of belongingness and entitativity are important for fostering team processes such as trust and reflexivity (Tjosvold et al., 2004). A strong collective identification within a team also creates a degree of social interdependence, or cohesion, which reflects the psychological bond and attraction between team members to one another, as well as to the team as a whole. Cohesiveness is an important in teams, because team members will be more willing to engage in cooperative behaviour if the ties that bind them are strong (Mullen & Copper, 1994). Further, when team identity is strong, team members will develop an inherent concern about the needs of the group and will therefore be more willing to make psychological investments, such as demonstrating loyalty (Zdaniuk & Levine, 2001) and dedication to their team. A perceived level of boundedness is therefore highly advantageous with regards to fostering team commitment, team building and synergism (Green, 2000; Naidoo & Wills, 2000). Consequently, team boundedness has been largely advocated as the preferred mode of structuring in recent team research (Armbruster, Gale, Brady, & Thompson, 1999; Green, 2000; Hackman, 2002; Kogler, Steckler, McLeroy, & Malek, 1998; Wageman et al., 2005).

In summary, boundaries are critical to determining one's position in an organisational setting (i.e. in-group versus out-group) and are crucial for facilitating team identify, which in turn encourages team members to pursue mutual goals in a collaborative manner (Somech, Desivilya, & Lidogoster, 2009). Further, bringing everyone together into a team means that required resources are always available, as and when they are needed (Drach-Zahavy, 2010). Boundaries are therefore fundamental to the definition of a team (Sundstrom et al 1990).

Therefore, the extent of team boundedness forms a fifth sub-dimension which contributes to the overall construct of team realness.

#### **4.4.6 Specified roles**

The sixth dimension of real teams proposed here is specified team member roles. Roles are a fundamental feature of teams (Hackman 1987; Humphrey, Morgeson & Mannor, 2009). Indeed, the dimension of team roles appeared consistently in the list of team definitions including that of Hackman (1990), Kozlowski and Bell (2003), Alderfer (1977) and Salas and colleagues (2007). Katz and Kahn (1978) describe an organisation as a system of roles, with these role-systems guiding social interactions between organisation members. For over fifty years, teams have also been conceptualised as a systems of roles (Bales, 1950). A role is defined as a pattern of behaviours perceived by an individual as behaviors that are expected by their organisation (Ilgen & Hollenbeck, 1991; Naylor, Pritchard, & Ilgen, 1980), and is considered as a key conceptual unit of the team (Ilgen et al., 2005) given that actions in teams are carried out through role behaviours (Katz & Kahn, 1978). The inclusion of specified roles in the real team model is also underpinned by social identity theory (see section 4.3.1.2), and more specifically identity theory (Stryker, 1968; Turner, 1978) which posits that an individual's identity emerges from the groups to which people belong, and the roles that they occupy within these groups. Role identities form distinct components of the self-concept and emerge through a process of self-definition, depending on the group to which one feels one belongs, the strength of team identification they have with this group, and how other group members react to a particular role identity (Hogg, Terry & White, 1995).

According to organisational role theory (Katz & Kahn, 1978), team roles define the specific position that an individual should occupy within the team. Conceptually, roles are patterns of behaviours perceived by an individual as behaviours that they are expected to perform while carrying out their tasks (Ilgen & Hollenbeck, 1991; Naylor et al., 1980). Although they are inherently interrelated, the literature clearly distinguishes between job tasks and roles, with the latter referring to expectations of behaviour engaged in while performing the job task, rather than the explicit task itself (Ilgen & Hollenbeck, 1991; Tubre & Collins, 2000). When individuals are formed into teams, their individual 'jobs' can be broadly defined (Mumford, Van Iddekinge, Moregeson & Champion, 2008) and highly flexible, including both formal and informal aspects (Mabry & Barnes, 1980). Mumford, Champion and Morgeson (2006) recently reviewed existing role typologies in the team literature and concluded that team roles can be grouped into three overall categories of task, social and boundary spanning

roles. Tasks roles concern the functional work that must be carried out to constitute the team's objectives. Delegation of these formal task team roles will depend largely on the types of skills, training and knowledge an individual brings to a team which will impact on how the team carries out their tasks. Behaviours related to task roles might include organising team meetings, making decisions about team objectives, allocating tasks, or coordinating a synchronised work flow (Mumford et al., 2008). Social roles concern the maintenance of the social environment within the team. Social role behaviours are typically related to communication, cooperation and calibration and may include active listening, effectively communicating divergent perspectives, and ensuring that every team member has an opportunity to contribute during decision making. Finally, boundary spanning roles are concerned with behaviours exhibited by team members beyond the team itself. Such behaviours might include coordinating with others teams, negotiating with outside parties or promoting the team's objectives in a favourable light (Mumford et al., 2008). Overall, when a strong team identity exists and individuals identify closely with their team, they are more likely to spend more time in a given team role, whether this be functional, social or boundary spanning in nature.

Team member roles form a key element in the structure and performance of teams. Given that teams are rarely homogenous, the majority are structured into a number of roles, such as generic roles, old-timer, new-comer, full member (e.g., Levine & Moreland 1994). As new members join the team and become socialised and other members leave, these roles evolve over time. However, specified team roles provide stability and constancy in teams; although team members may come and go, the team remains intact because of roles that direct norms and behaviours (Katz & Kahn, 1978). In the complex and evolving environment of today's organisations, clearly specified team member roles are crucial if a team is to survive, adjust to changes in membership, retain learning and remain viable and effective. It has long been acknowledged that for a team to perform effectively, the fulfilment and coordination of team's roles is critical to avoid process losses, dysfunctional conflict and role ambiguity (Steiner, 1972). When team roles are clear, specified and understood by everyone within the team, members are able to recognise their interdependence and the importance that their own contribution has in completing the team task. Clearly defined team roles foster stability and constancy within the team. Although team membership may change over time, clearly defined roles that guide expected behaviour will ensure that the team remains enact and viable (Katz & Kahn, 1978). Role clarity is particularly important in highly interdependent teams, as performance depends largely upon the effective interaction of team members (Jackson & Schuler, 1985). In such situations, the potential for role ambiguity is high, as team members

must carefully orchestrate multiple sub-tasks in a timely and co-ordinated fashion. Role ambiguity occurs when there is a lack of clear information associated with a particular role in a group (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). When the behavioural repertoire of a role is unclear, there is a lack of understanding about what constitutes effective job behaviours. Further, if team members fail to communicate (or mis-communicate) their expectations and standards of behaviour to their colleagues, contradictory information can flow within the team, and role conflict is likely to occur. The presence of role conflict indicates that there is a discrepancy, or incompatibility between the behaviours expected by the role senders, and those perceived by the role performer(s) (Katz & Kahn, 1978).

In today's complex and ever-changing work environment, team members often belong to more than one team. According to Ilgen and Hollenbeck (1991), team member roles are dynamic and evolve over time. If team boundaries are ambiguous, team members may be faced with blurred and unidentifiable roles, particularly when team tasks are highly interdependent and sub-tasks are distributed amongst members (Tubre & Collins, 2000). When team member roles are unclear and unspecified, role ambiguity and role conflict can have detrimental effects on organisational outcomes including low job performance, low job satisfaction and tension (Abramis, 1994; Fisher & Gitelson, 1983; Jackson & Schuler, 1985). Conversely, high role clarity has been associated with higher role efficacy and performance effectiveness (Bandura, 1997).

To summarise, it is proposed that specified team member roles constitutes the final key sub-dimension in the definition of a real team. Members of real teams will clearly understand what their role(s) require(s) of them, whether these are functional, social or boundary spanning in nature. Furthermore, members of real teams, due to their high levels of interdependence and self-regulation, will also be clear about the roles that the other team members occupy in the group.

#### **4.5 CONCLUSION**

The definition of real teams proposed here refers specifically to teams that are embedded in organisations, rather than alternative types of teams such as sports teams, social groups or other collectives which operate in a given context. The primary focus of this conceptualisation is on action teams – these are teams which ‘*do things*’ (Kozlowski & Ilgen, 2006; p. 80). In their efforts towards achieving team objectives, such teams have to make decisions and adapt

solutions in order to overcome task related problems. The focus is on action teams because these are the broadest type of teams relevant in organisations today (Kozlowski & Ilgen, 2006); that is, they typically work in complex performance contexts that are characterised by highly structured tasks which require differentiated team roles and coordinated workflow patterns (Kozlowski et al., 1999). Although the real team model will be most appropriate for action teams, is it sufficiently broad to be applicable to all types of work teams in organisations, and therefore has a high degree of generalisability. The definition of a real team presented in this thesis can accommodate for the many labels that have been used to describe groups and teams in the organisational psychology literature. These include project teams, semi-autonomous work groups, empowered teams, top management teams, crews, quality circles, self-managing teams, or task forces. Examples of such teams could be production teams, aircrews, multi-disciplinary mental health care teams, R&D teams or emergency response teams. The continuum approach taken here allows there to be *degrees of difference*, as opposed to fundamental divergences between such teams (Guzzo & Dickson, 1996). Team realness increases as the degree of interdependence, autonomy and boundedness goes up, the sharedness and clarity of objectives increases, the team engages in more self-regulation, and team members more clearly understand one another's roles in the team. Thus, team realness is not an all or nothing concept, and a team may be more of a real team during one task than they are on another. This is because, to some extent, the degree of team realness will be partly determined by the nature of the team task. Indeed, the team task will determine the coordination requirements and workflow structure that are necessary for accomplishing team objectives (Kozlowski & Ilgen, 2006). Thus, a team cannot be much of a real team if they are not given a task which requires 'team work' (Hackman, 2002). However, as has been discussed in this chapter, real teams are not solely defined by their task or work structure, but also by their teamwork processes.

Overall, the six dimensions captured by the real team model presented in this chapter have provided a theoretical model which can be used to identify to what extent a collection of individuals who consider themselves to be, or are considered by others to be a team, are in fact a real team. Guided by three underlying theoretical perspectives, interdependence theory, social identity theory and self-regulation theory, the real team model is based on an extended conceptualisation of the real team construct which is not only grounded in traditional definitions of real teams, but also acknowledges more recent trends in the literature to define teams as adaptive self-regulating systems (Kozlowski & Ilgen, 2006; McGrath et al., 2000; Salas et al., 2007). The model therefore provides is a new theoretical framework which can be operationalised into an applied scale for diagnosing 'team realness'. As is described in the

forthcoming chapter, this scale consists of a small number of validated items, which reliably measure each of the real team sub-dimensions. Given that team realness is conceptualised as a shared team property (cf. Chan, 1998; Molleman, 2005) team member responses are aggregated to the team-level to provide an overall indication of ‘team realness’.

The development of such a measure is crucial to ensure that we are able to recognise the true impact of real team working, and avoid drawing important conclusions about all work teams on the basis of research with pseudo teams and such like. Indeed, when doing research with teams in organisations, we must first be clear about exactly what sort of teams we are dealing with. Such a reliable, valid and widely applicable scale would not only provide team researchers with a clearer understanding of the teams they choose to study, thus providing new epistemological scope for studying teams, but would also provide practitioners with a valuable means of clarifying and enriching organisational evaluation; a process which is becoming increasingly important in the endeavour for quality improvement (Quijano & Navarro, 1999). Overall, it is hoped that the real team model will call for a reflective pause on research into teams, with the purpose being to develop a parsimonious and validated approach for identifying and measuring the realness of all types of team which are operating in today’s organisations.

## Chapter 5: Methods and samples

### 5.1 CHAPTER SUMMARY

This chapter provides a detailed overview of the methods adopted for the development and validation of the real team scale. Firstly, the philosophical paradigm and methodological approach which guided the research is discussed. A brief summary of the concept of validity is then provided, covering the specific types of validity that have been investigated in this thesis. Following this, an overview of the research design is presented which summarises the seven validation studies which comprise chapters 6 and 7. Finally, a detailed description of each data sample is provided, including data collection procedures, measures, research setting, access and ethics, and the preparation of data for analysis.

### 5.2 RESEARCH PARADIGM

According to Kuhn (1970), a paradigm can be defined as the representation of beliefs, values, rules and techniques accepted by any mature scientific field at any given time. Paradigms are human constructions that guide action (Guba & Lincoln, 1994). Each scientific paradigm provides a ‘world view’ and an overall conceptual framework within which researchers generate knowledge (Healy & Perry, 2000).

The positivist paradigm is the predominant research tradition in the social and behavioural sciences, and logical positivism has profoundly influenced methodological thinking in psychology (Tolman, 1992). The quantitative imperative, the view that to study something scientifically means to measure it, has been seen as a key expression of positivism (Michell, 1990). Qualitative methods, and thus interpretivist research, has subsequently been dismissed in mainstream psychology research on seemingly *a priori* grounds (Michell, 2003). However, Henwood (1996) argues that despite their clear distinctions, qualitative and quantitative methods should not be seen as mutually exclusive. Rather ‘*each method reveals different aspects of empirical reality...multiple methods of observation must be used in every investigation, since no method is ever free of rival causal factor*’ (Denzin, 1970, pp.28-29). It has been argued that quantitative and qualitative research methods should not be seen as incommensurable paradigms, as both approaches share some commonalities and overlap in various ways (Bryman, 2001). Research by Bryman (2006) indicated that in the discipline of

management and organisational behaviour, 23% of research adopts a mixed-methodology approach.

Hammersley (1996) uses the term '*methodological eclecticism*' to convey the multiple advantages of a mixed-methodological approach. Justifications for adopting mixed-methods include triangulation (a single point is considered from three independent sources), complementarity (seeking clarification from different sets of results), development (results from one method are used to develop another method) and expansion (developing rigour and widening breadth of research) (Greene, Caracelli, & Graham, 1989). Adopting a mixed-methodological approach does not imply a combination of paradigms in a wholesome sense. For the purposes of this thesis, I will adhere closely to a positivist epistemology (researcher is objective and value free) and ontology (there is one reality that is real and apprehensible). It is only in terms of methodology that I will adopt some methodological tools which are not considered to be historically positivist. Indeed, statistics generated from positivist research may not tell the whole story. Therefore, supplementing ones work with qualitative data will ultimately contribute positively to the overall generation and comprehension of knowledge. Through adopting a mixed-methodological approach, a researcher is in a better position to interpret the complex relationship between variables, thus gaining an insight into a richer and more comprehensive picture of the relationships between variables.

Qualitative research involving focus groups or semi-structured interviews is common practice in the process of scale development. Inductive approaches are useful if the concept at hand is novel or only recently established in the literature, or clear operational definitions do not exist. Qualitative data can also provide a means of validating quantitative relationships and exploring them in more depth. This approach is referred to as a sequential exploratory strategy (Creswell, 2009), whereby elements of an emergent theory from a qualitative phase of research feed into a quantitative phase of research (Morgan, 1998). Although quantitative methods will be the primary focus of this research, qualitative methods are used to allow for a concurrent triangulation strategy (Creswell, 2009). This is the most commonly adopted approach in mixed methodology research, whereby quantitative and qualitative data is collected in a concurrent fashion and then simultaneously compared to draw various comparisons. These comparisons may come in the form of confirmation, disconfirmation, corroboration or cross-validation (Greene et al., 1989; Steckler, McLeroy, Goodman, Bird, & McCormick, 1992). This traditional mixed methods approach is well accepted and familiar to most researchers and can result in findings that are both substantiated and well-validated (Creswell, 2009). The specific approach employed to collect quantitative and qualitative data

for the purposes of this scale development is discussed in greater detail in the following sections. Before that, the concept of validity will be clarified.

### 5.3 VALIDITY

The concept of validity is central to the development of a psychometric measure. Test or measurement validity is concerned with the extent to which a scale is actually measuring what it claims to measure. According to the American Psychological Association (1985), researchers involved in scale development should seek to establish content validity, construct validity and criterion-related validity, each of which will not be briefly outlined.

Firstly, content validity is concerned with the adequacy with which a measure captures and assesses the domain of interest (Hinkin, 1998). Content validity is typically established taking a deductive approach, whereby a sample of items are systematically identified and assessed by appropriate experts. This type of validity can therefore be established immediately after the development of an item pool (Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993). Part of establishing content validity also involves the validation of the structure of the given construct. If a scale is designed to have multiple components (sub-scales), factor analysis techniques are used to explore whether these components actually underlie the responses to the instrument in the expected way. Secondly, construct validity addresses the relationship between the new measure and the underlying attributes it is theoretically designed to assess. Nomological validity is a form of construct validity which examines the extent to which the construct of interest behaves as it should within a network of related constructs. The formulation of a nomological network is an important phase in the development of a valid measure (Cronbach & Meehl, 1955). A researcher should begin by proposing a number of hypotheses that relate the focal construct to other theoretically related constructs, before using various methods to accumulate evidence (Messick, 1995). Indeed, in the construction of a scale, it is critical to establish that the construct under development is both appropriately related (convergent validity) yet sufficiently distinct (discriminant validity) from other theoretically relevant constructs. Convergent validity concerns the extent to which the new measure of a construct relates to other measures of the same underlying construct (Bryant, King & Smart, 2007). Conversely, discriminant validity is concerned with ensuring that the new construct measures something theoretically distinct and is not simply a surrogate measure for a related construct (Campbell & Fiske, 1959). Finally, criterion-related validity is concerned with associations between the construct at hand and theoretically relevant external

outcomes. Again, the nomological network guides this process, allowing the researcher to explore concurrent and predictive validity, both of which are sub-strands of criterion-related validity. Concurrent validity examines the relationship between the construct at hand and other relevant concrete measures or criteria which were assessed simultaneously. Predictive validity is concerned with the extent to which a construct can predict future events. Overall, the seven validation studies presented in this thesis aim to address each of these core types of validity in the development of the real team scale.

#### **5.4 RESEARCH DESIGN OVERVIEW**

In the psychometric literature, a number of advocated guidelines have been published to guide researchers in the development of a new measure (e.g. Ghiselli, Campbell, & Zedeck, 1981; Schwab, 1980). For the purposes of developing the real team scale, the steps outlined by Hinkin (1995; 1998) were followed, supplemented by the more recent guidelines detailed by DeVellis (2003) in his book on scale development.

The overall aim of this thesis was to develop a valid, parsimonious, yet relatively short measure of team realness that could easily be incorporated into a wider questionnaire, to help team researchers determine to what extent the teams in their study exhibit characteristics of real teams. It was important that the final measure: (a) captured the full domain of the construct definition outlined in chapter 4, (b) was short and concise enough to be easily incorporated into a wider questionnaire for any sort of work team, without taxing the time and energy of respondents, (c) was clear and understandable to working adults, and (d) was composed of items which used ‘team’ as the key referent, allowing for team level phenomenon to be captured.

Following recommendations by Hinkin (1995) and DeVellis (2003), a multistage development process was used to optimise the integrity of the new instrument (see table 5.1). The overall stages in this process include item generation, scale development and scale evaluation (Schwab, 1980). The primary aim of studies 1 and 2 was to examine the content and structural validity of the real team measure. The resulting twelve-item measure was then examined on the basis of its convergent, concurrent, discriminant and predictive validity in studies 3 to 7. Results from studies 1 and 2 are reported in chapter 6. The remaining validation studies are reported in chapter 7.

**Table 5.1: Validation studies outline**

Study	Action/analysis	Validity established	Data/sample
Study 1	Construct development Exploratory factor analysis (EFA) of existing dataset Development of new items Expert ratings of 17 item scale Cognitive interviews Item sorting task	Content validity	<i>N</i> = 1005 3 expert raters 6 interviewees 10 item sorting participants
Study 2	Expert ratings on content adequacy EFA and confirmatory factor analysis (CFA) Reliability estimations Item reduction to a 12-item scale	Content validity ( <i>structural and face</i> )	<i>N</i> = 311 (sample 1) <i>N</i> = 639 (sample 2) <i>N</i> = 311 (sample 3)
Study 3	Correlational analysis using self-validation items	Construct validity ( <i>convergent</i> ) and Criterion-related validity ( <i>concurrent</i> )	<i>N</i> = 53 teams (sample 1) <i>N</i> = 63 teams (sample 2)
Study 4	Expert coding of real team dimensions using team meeting transcripts	Construct validity ( <i>convergent</i> ) and Criterion-related validity ( <i>concurrent</i> )	<i>N</i> = 21 teams (sample 1)
Study 5	Expert coding of written team objectives	Construct validity ( <i>convergent</i> ) and Criterion-related validity ( <i>concurrent</i> )	<i>N</i> = 51 teams (sample 1) <i>N</i> = 63 teams (sample 2)
Study 6	Distinguishing team realness from team satisfaction	Construct validity ( <i>discriminant</i> )	<i>N</i> = 311 (sample 1) <i>N</i> = 639 (sample 2)
Study 7	Regression analyses using objective team performance data, external ratings of team performance and productivity, and group assignment scores	Criterion-related validity ( <i>predictive</i> )	<i>N</i> = 53 teams (sample 1) <i>N</i> = 43 teams (sample 2) <i>N</i> = 52 teams (sample 3)

## 5.5 DATA COLLECTION OVERVIEW

Primary data was collected from three samples; firstly a student sample of undergraduate business game teams (sample 1), secondly a real-world sample of teams within a large public-sector organisation (sample 2), and thirdly a student sample of postgraduate project teams (sample 3). The data collection strategy is summarised in table 5.2. The data collection procedure for each of these samples will be discussed more fully in the following sections.

**Table 5.2: Data collection strategy**

Sample	Team member questionnaire (time 1 only)	Team member questionnaire (times 1, 2 & 3)	Team rater questionnaire (times 1 & 2)	Team performance data	Qualitative data
Sample 1	✓	-	-	✓	✓
Sample 2	✓	-	✓	✓	✓
Sample 3	-	✓	-	✓	-

## 5.6 SAMPLE 1

### 5.6.1 Research design

A cross-sectional design was adopted to collect questionnaire data from team members at one point in time. Although a longitudinal design would have been preferable, time restrictions did not allow for a second wave of data collection from this sample. Typical limitations of cross-sectional designs, such as same source common method variance, were not considered as a critical limitation of data from this sample, as the outcome measures of team performance consisted of objective financial data generated by business simulation software.

One questionnaire was developed for the purposes of validating the new measure with the first sample. As the item list was largely drawn from a large and psychometrically robust existing measure (see chapter 6), and given that the newly developed items had been subjected to cognitive testing and item sorting procedures, further piloting of the measure was not deemed necessary. Electronic performance data for each team was also gathered at the end of a simulation task.

### **5.6.2 Research setting**

Over 500 undergraduate students enrolled on various business undergraduate degrees in a UK University were approached for participation. The students were all in their second year of study and were allocated into teams at the beginning of the academic year to work together on the business game module. Each team consisted of between four and five individuals who worked together over the course of the academic year on a business simulation task.

The software used for the simulation was 'Eurocar'. This business simulation required each team to operate as an independent car manufacturing company working in the European automotive industry. The teams were therefore task-orientated project teams, as they were working together for a limited amount of time, carried out tasks that required the application of knowledge and judgement, and produced on-time outputs (Cohen & Bailey, 1997). Over the eight month period, each team had to perform a wide variety of tasks including presentations, a business plan and a final business report, as well as ongoing financial and market analysis, all of which contributed towards their preparation and strategy for the simulation task itself. The teams were self-managing and had complete discretion in determining and implementing their business plan. At the beginning of the course they were encouraged to allocate various roles to team members (managing director, finance director, marketing director etc.). They were provided with detailed market data on the European car industry, and therefore had the opportunity to make informed decisions on their business strategy. After formally presenting their business strategy and submitting a written business plan for assessment, the teams were given a one hour training session on the Eurocar software. They were also given an instruction booklet on how to operate the software.

At week eight of the 22 week course, the simulation task started. For each simulation session groups of six teams were seated around computers in a computer lab, during which they competed with one another under timed conditions using the software to implement and manage their business strategy. Overall, the simulation task comprised of six one-hourly sessions, which occurred every fortnight over a twelve week period. Over the course of these six sessions, the simulation covered a hypothetical period of three years, with performance data being generated on a weekly, monthly and yearly basis. During the weeks between each simulation session, the teams met in one-hourly classroom tutorials, during which they were encouraged to review the data from the simulation software, discuss their performance, and develop their strategy for the following week.

At the end of the module, 65% of the students' assessment was dependent on their performance in group work; 10% of this was based on a team's financial performance in the simulation and a further 55% comprising of group assessed coursework based on their strategy and performance in the simulation task. The objective financial data generated during the simulation task allowed the researcher to explore the predictive validity of the new measure. However, the remaining performance on the group assessed work was not deemed as an appropriate objective performance measure, as there would have been an inevitable degree of subjectivity and error in the different assessors marks across the module.

According to Hinkin (1995), a key measurement issue which must be considered in scale development is the impact of the chosen sample. It is critical that the sample chosen is representative of the wider population to which the results will be generalised. As the new measure was intended for use with any sort of work team in an organisational context, an initial sample comprising of undergraduate business students was deemed appropriate for informing the researcher about the initial validity of the new measure. Although it is recognised that no simulation task can reflect the true reality of a work environment, the data provided from this study still provided a sound insight into the initial psychometric properties of the new scale items. The teams themselves were not only comprised of students who, due to their choice of study, were likely to pursue a career in business once graduating from university, but were also engaged in a task which closely resembled those carried out in real team-based organisations of today, given its complex, multifaceted and challenging nature. Further, given that a large part of the course assessment was based on the overall success of their team in the simulation task, it is likely that the students were motivated to contribute their efforts and work effectively with their fellow team members, given the interdependent nature of the outcome. Finally, this first study provided the advantage of controlling for the wider organisational context within which the participating teams were embedded. Recent literature has noted the increasing awareness that teams can be better understood in the wider environment in which they operate, as this external organisational system can serve to facilitate or hinder team effectiveness (Gladstein, 1984; Gully, 2000; Hackman & Morris, 1975, McGrath, 1964). Such features of this system may include HR policies, technological uncertainty or environmental stability (see Mathieu et al., 2008 for a review). Given that all such wider organisational features remained constant in the context of the business game task, their potential contribution to performance was controlled for. Overall, although it is recognised that student teams can not be equated with work teams in organisations, similarities can be drawn between them.

### **5.6.3 Access and ethics**

Permission to conduct a module-wide questionnaire across the undergraduate sample was sought from the director of undergraduate studies as well as the module leader. This coincided with a successful application to the Aston Business School Research Ethics, which detailed all of the ethical considerations relating to the study and provided a clear explanation of how these were addressed.

### **5.6.4 Procedure**

As the sample had already completed a paper-based questionnaire about working in their business game team as part of another research project, the researcher decided to offer a different method of participation for this study in order to boost response rate. Participants were initially invited to complete an online version of the questionnaire. Online methods for questionnaire administration have become increasingly popular of recent years due to their low cost, ease of distribution and convenience for collecting, collating and analysing data quickly and efficiently. All students registered on the business game module received an e-mail via their university webmail account inviting them to participate in the research. They were asked to complete the online team member questionnaire in their own time by clicking on the URL link provided in the e-mail invitation (see Appendix B.1). As an incentive for completing the questionnaire, and to further increase response rate, all participants could choose to opt into a free prize draw to win a games console.

The first e-mail invitation was sent at the beginning of week 17 of the 22 week course. Two further reminder e-mails were sent over the next two weeks. At the first point of data collection, the teams had all completed four of the six simulation sessions. Given that temporal considerations are becoming increasingly important in the team development literature (Kozlowski et al., 1999), collecting the data at this point in the course ensured that the teams had been given sufficient time to develop and establish team norms, and were familiar enough with their team functioning in order to answer the questionnaire items informatively.

As part of the validation of the new measure, the researcher also wanted to gather qualitative data from the participating teams which involved the recording of team meetings (see chapter 7, section 7.4.1 for a full description of the methodology). Before the recording of their team meetings, team members who had not already completed the online questionnaire were given the opportunity to complete a paper-based version. This mixed-

mode approach was adopted because it was crucial to collect enough data from the teams which had volunteered to have their team meetings recorded in order to generate team-level scores from the questionnaire, and thus reliably investigate the convergent validity of the new measure. Researchers have argued that using mixed-mode questionnaire techniques can improve the representativeness of the sample without biasing other results (Yun & Trumbo, 2006). Mixed-mode questionnaires also allow an opportunity to compensate for the drawbacks of any one method used in isolation. The questionnaire appeared in exactly the same format in both the online and paper-based version and participants were instructed not to complete the questionnaire twice.

### **5.6.5 Participants**

The module comprised of 702 individuals in 156 teams. Each team had four or five members, with the vast majority having both genders, at least two nationalities and a variety of undergraduate majors. This demographically diverse distribution reduced the need to include such variables as controls, thus optimising degrees of freedom in the statistical analysis. A response rate of 44% yielded 311 respondents, representing 136 teams. The cover sheet of the questionnaire clearly specified that participation in the research was completely voluntary, participants could withdraw from the research at any time, and that participation would in no way influence performance on the module.

### **5.6.6 Team member questionnaire design**

As detailed below, the questionnaire consisted of the item list for the new measure, some self-validation items, and various established measures from the literature. A copy of the paper-based version of the team member questionnaire used for sample 1 can be found in Appendix B.2. A cover sheet on the front of the team member questionnaire outlined the aim of the study, confidentiality, anonymity, possible dissemination of results, the time required to complete the questionnaire, how to answer the questions using the response scales provided, and information about the prize draw.

Level-of-analysis issues were critical in the design of the questionnaire. According to multilevel theory (Chan, 1998; Kozlowski & Klein, 2000), theory should always guide the choice of measures. Given that the measure under development is conceptualised as a team level construct, the researcher ensured that any other scales which were incorporated into the

questionnaire also used ‘team’ as the key referent with the underlying constructs of each also emerging at the team level of analysis.

#### **5.6.6.1 Measures**

Measures in this study consisted of questionnaire responses filled out by team members and yearly financial performance data drawn from the business game simulation task. Only measures relevant for discussion in this thesis will be outlined here.

***Real team scale.*** As will be discussed in substantial detail chapter 6, the new measure under development incorporated 17 items which used a 5 point likert scale, with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For scale reliability analysis, see chapter 6 (section 6.3).

***Team satisfaction.*** The team satisfaction scale consisted of three items from Van der Vegt, Eman and Van de Vliert (2001), an example being ‘*I am very satisfied with working in this team*’. The scale used a 5 point likert scale, with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The alpha reliability co-efficient for the scale was 0.95.

The questionnaire also included a number of self-validation items to aid the researcher in establishing the convergent and concurrent validity of the new measure. The self-validation items for each respective sub-dimension were as follows;

***Autonomy.*** Three reversed-scored items were written to capture the actual frequency with which teams felt that they had autonomy over their objectives and processes. An example item was ‘*How often do people outside of the team decide how you will carry out team tasks?*’ The scale used a 4 point likert scale, with responses ranging from 1 (*always*) to 4 (*never*). Respondents could also indicate 5 (*don’t know*). The three items were combined to form an overall autonomy score, with an alpha reliability of 0.70.

***Interdependence.*** Three separate items were written to validate the interdependence sub-dimension. As the items used different response scales, they were treated separately for analysis. The first item aimed to capture the need for team interaction frequency using the question ‘*How often do you have to work with other members of your team to complete the team's task?*’ The reverse-scored item used a 5 point likert scale, with responses ranging from 1 (*on an hourly basis*) to 5 (*on a yearly basis*). As interdependent tasks require team

members to combine their various skills and knowledge, the second item sought to validate whether the team size was appropriate for the given task using the question ‘*The team has about the right number of people to do the task well*’ using a five point likert scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The final item checked the extent to which team members relied on their fellow teammates for task completion using the question ‘*How many of the other members of your team do you have to regularly work closely with in order to complete your team task?*’ This item used a four point likert scale with responses ranging from 1 (*none*) to 4 (*all*).

**Reflexivity.** Four separate items were written to validate the reflexivity sub-dimension. Again, as the items used different response scales, they were treated separately for analysis. As team reflexivity is most likely to occur during team meetings, the first question asked respondents to indicate how many times their team meets in an average month. The second item sought to capture the extent to which team members considered team meetings as important for team effectiveness, using the question ‘*The team holds meetings regularly enough in order to do the task well*’ using a five point likert scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The third and fourth reflexivity self-validation items sought to capture evidence that reflexivity had occurred in the team and that as a result, changes had been implemented. The third item focused on the reviewing of objectives, asking ‘*Since the beginning of the business game modules, have the team’s main objectives changed?*’ The reverse-scored item used a three point likert scale with responses ranging from 1 (*Yes, a lot*) to 3 (*No*). Respondents could also indicate 4 (*don’t know*). The final item sought to capture any changes in team processes, asking ‘*Since the beginning of the business game module, have the methods used by the team to get the job done changed?*’ again with responses ranging from 1 (*Yes, a lot*) to 3 (*No*), and 4 (*don’t know*).

**Shared objectives.** Team members were asked to write down three of their team’s main objectives in a blank text box provided. This allowed the researcher to establish whether scores on the objectives items in the real team scale correlated with the specificity and agreement between team members on the actual written objectives of the team, as rated by an external rater (see validation study 5 in chapter 7).

**Financial performance data.** A number of dependent variables were considered in order to test the predictive validity of the new measure. Financial performance data from the business game simulation was used as an objective measure of each team’s company performance. A commonly adopted financial measure of company performance is Return on

Capital Employed (ROCE). Data on this dependent variable was gathered for the end of years one, two and three.

### 5.6.7 Response rate

As the team formed the primary level of analysis, it would have been most ideal if data was collected from every member of a given team. However, as this is almost impossible to attain in organisational field research, it was important to check that data provided from a given number of team members was sufficiently complete and representative of the team as a whole. Dawson’s selection rate (2003) assesses the relative accuracy of aggregate measures which are based on incomplete group data using the formula  $SR = (N-n)/Nn$  (where ‘N’ is group size and ‘n’ is group responses). An SR of 0.32 was chosen as a cut-off point for teams from both samples, as this is the level that scores generated from incomplete data are generally correlated with true scores at 0.95 or higher (Dawson, 2003).

Questionnaire data was collected from 311 individuals representing 136 teams (44.3% response rate). However, following the Dawson’s selection rate formula, 83 teams provided incomplete data, leaving 54 teams for team-level analysis.

#### 5.6.7.1 Team demographics

**Table 5.3: Team size and meeting frequency**

	<b>N</b>	<b>Range</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>S.D</b>
Team size	54	1.00	4.00	5.00	4.52	0.50
Frequency of team meetings (per month)	54	6.33	2.33	8.67	4.71	1.17

All teams were the same age. As can be seen in table 5.3, team size also had very little variability within the sample with 26 teams (48.1%) comprising of 4 members and 28 teams (51.9%) comprising of 5 members. However, interaction frequency in terms of team meetings varied more so across the sample. Some teams met just twice in a typical month, whereas other teams met twice a week.

## **5.7 SAMPLE 2**

### **5.7.1 Research design**

A longitudinal design was adopted to collect questionnaire data from team members at one time point, and from external team raters at two time points. This allowed the researcher to overcome methodological problems related to common method variance, given that the source of the dependent variable was outside of the team. Causality could also be established by controlling for the dependent variable at time 1 when predicting team performance outcomes at time 2. Two questionnaires were developed for the purposes of validating the new measure with the second sample; one for team members and one for team raters. At this stage, data from sample 1 had already been collected, and initial results were available. Therefore the piloting of questionnaires was not deemed necessary.

### **5.7.2 Setting**

According to Hinkin (1995), a key measurement issue which must be considered in scale development is the impact of the chosen sample. It is critical that the sample chosen is representative of the wider population to which the results will be generalised. As the new measure was intended for use with any sort of work team in an organisational context, a sample of real-world teams was ideal for further establishing the validity of the new measure.

Data was collected from a large UK public sector organisation which employs approximately 35,000 staff. The organisation provides a wide array of services to the local area. Although the organisational structure reflects a traditional hierarchical design, the organisation is comprised of many established and identifiable 'teams' which deliver a diverse range of services from education and transport to IT and environmental services. The organisation is structured in 10 directorates, which themselves are sub-divided into various divisions. Any type of team was invited for participation, regardless of task type, service, team size or management level.

### **5.7.3 Access and ethics**

Prior to approaching organisations for participation, the researcher was granted ethical approval for the research from the University Research and Ethics Committee. Access to the sample was negotiated with the Head of Organisational Development of the organisation between April and September 2008. The researcher was granted access to all of the work teams in the organisation, providing that they agreed to participate.

#### **5.7.4 Procedure**

In December 2008, an initial e-mail invitation was sent to all staff working for the organisation inviting their work teams to participate in the research (see Appendix B.3). Due to the interference of the Christmas period, the same e-mail was sent out again mid-way through January 2009. 101 teams initially registered their interest in participating in the project and were sent a project document detailing what was involved (see Appendix B.4). After receiving this further information, 74 teams formally agreed to participate and completed a team data collection form (see Appendix B.5). This form requested the team to nominate a team contact with whom the researcher could liaise, choose an appropriate mode for their questionnaires (either online or paper-based), choose how their questionnaires would be distributed (either directly from the researcher or via the team contact) and list the names and e-mail addresses of team members.

The team was also asked to consent to having an outside team manager rate their performance. Where consent was provided, teams were asked to identify an outside line manager who was familiar with their team. The researcher then contacted each manager directly to firstly establish whether they were in an appropriate position to reliably rate the team. Team raters were required to be at least middle management and had to be familiar with the team's performance. However, they could not be a member of the team themselves. Where appropriate, when team raters were not at first identified, the researcher worked with the given work team's department to identify a relevant manager. Once a team was fully recruited, the researcher provided team member questionnaires in the requested format to all team members. Due to the nature of their work, some of the teams who chose to participate did not have easy and/or frequent access to the internet. Therefore, the researcher again decided to offer a mixed-mode questionnaire in order to boost response rate and to ensure that all participants were given equal opportunity to complete the questionnaire.

The online version of the questionnaire was designed and collected using 'Survey Monkey'. This online survey provider allowed the researcher to set up a unique 'collector' for each participating team. A standard invitation e-mail was then sent to each team member which included a URL link to the secure online questionnaire. For a copy of the e-mail invitation, see Appendix B.6. Survey monkey allowed the researcher to monitor the response rate for each team, and send reminder e-mails to only those team members who had not already completed the questionnaire. A total of separate three reminders were sent to outstanding team members.

For teams which requested the paper-based version, batches of questionnaires were either posted or hand delivered to their workplace by the researcher. Each team members questionnaire was accompanied by a covering letter, which was identical to the e-mail invite in the online version (excluding the URL link). A pre-paid envelope was also included which allowed team members to individually post back their completed questionnaires to the researcher at Aston University. Again, a total of three reminders were sent to outstanding team members.

### **5.7.5 Team member questionnaire design**

Overall, the team member questionnaire for sample 2 closely resembled that used for sample 1. A copy of the paper-based version of the team member questionnaire used for sample 2 can be found in Appendix B.7. As can be seen, some additional pre-established scales were included in the questionnaire. However, only those relevant for analysis in this thesis will be discussed here.

#### ***5.7.5.1 Questionnaire content***

The coversheet of the questionnaire outlined a brief description of the research, how long it would take to complete the questionnaire, how to fill in responses to questions, the assurance of confidentiality and anonymity, and how and to whom results would be reported. As some of the team members completing the questionnaire typically belonged to more than one team within the organisation, the coversheet also instructed respondents to think only about the team which had agreed to participate in the project. The name of this team was also referred to in the accompanying cover letter.

***Real team scale.*** In order to ensure a high level of response rate, the real team scale was the first block of questions included. As will be discussed in substantial detail in chapter 6 (see validation studies 1 and 2), the new measure under development incorporated 17 items which used a 5 point likert scale, with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For scale reliability analysis, see chapter 6 (section 6.3).

***Team satisfaction.*** The same team satisfaction scale used in the sample 1 questionnaire was used (Van der Vegt, Emans & Van de Vliert, 2001), with an alpha reliability coefficient of 0.91.

Some changes were made to the self-validation items from the sample 1 questionnaire in order to improve clarity and readability. The self-validation items for each respective sub-dimension were as follows;

**Reflexivity.** Three separate items were developed to validate the reflexivity sub-dimension. The items were designed with an aim to quantify to what extent reflexivity had influenced subsequent team goals and processes, using a 5-point response scale (1 = *not at all*, 3 = *a moderate amount*, 5 = *very much*). The first item sought to capture how much teams reflected on their progress with the question ‘*during the past six months has the team discussed whether it is meeting its objectives?*’ This next question asked ‘*during the past six months have the team’s main objectives changed?*’ the assumption here being that high levels of team reflexivity may foster more frequent changes in team goals. The third question focused on changes in team processes by asking ‘*during the past six months have the methods used by the team to get the job done changed?*’

**Interdependence.** Two items were written to validate the interdependence sub-dimension. Both items used a 5-point response scale (1 = *not at all*, 2 = *on a monthly basis*, 3 = *on a weekly basis*, 4 = *on a daily basis*, 5 = *on an hourly basis*). The items sought to capture the interaction frequency required between team members. The first question focused on the respondent her/himself by asking ‘*during the past six months, how often have you had to work with other members of your team in order for the team to accomplish its goals and responsibilities?*’ Taking a similar approach, the second item required the respondent to think about the interactions between his/her other team members with the question ‘*during the past six months, how often have other members of your team had to work together in order for the team to accomplish its goals and responsibilities?*’

**Autonomy.** The same three reversed-scored items used for the sample 1 questionnaire were included to validate the autonomy sub-dimension. However, the response scale was changed slightly to complement the 5-point style scale used throughout the sample 2 questionnaire. The 5-point scale ranged from 1 = *never* to 5 = *always*, and an example item was ‘*how often do people outside of the team decide how you will carry out team tasks?*’

**Shared objectives.** As with sample 1, team members were asked to write down three of their team’s main objectives in a blank text box provided, thus allowing the research to explore the convergent and concurrent validity of items in the scale (see validation study 5 in chapter 7).

**Demographics.** A number of individual and team level demographics were also included in the team member survey. Firstly respondents were asked to indicate their sex, age, how long they had worked for the organisation, and how long they had worked in their team. They were also asked to indicate their ethnic background, along with some job related information including staff grade, directorate, division and job title. Following this, they were asked to write down how many people worked in their team, how many times the team meets during the average month, and how many people had joined and/or left the team in the past six months. Finally, respondents were asked how long the team had been set-up, whether it was a temporary or permanent team, and how many other teams they worked for in the organisation.

### **5.7.6 Team rater questionnaire design**

In a similar way to the team member questionnaire, the team rater questionnaires (time 1 and time 2) included a coversheet detailing how the respondent should complete the questionnaire, and how the data would be used. A copy of the paper-based version of the team rater questionnaire (at time 1) can be found in Appendix B.8. The questionnaire included two pre-established scales that have been used in previous research to measure team productivity and team performance.

**Team productivity.** Team productivity was measured using a six-item scale developed by Kirkman and Rosen (1999), which used a 5-point response scale (1 = *strongly disagree*, 5 = *strongly agree*). An example item was ‘*The team meets or exceeds its goals*’. The alpha reliability coefficients at time 1 and time 2 were 0.87 and 0.86 respectively.

**Team performance.** Team performance was measured using a six-item scale developed by Vinokur-Kaplan, 1995) which used a 5-point response scale (1 = *not at all*, 5 = *completely*). An example item was ‘*During the past 6 months, to what extent do you feel that the team has met the standards of quality expected by the organisation?*’ The alpha reliability coefficients at time 1 and time 2 were 0.90 and 0.92 respectively.

#### **5.7.6.1 Time frame of questionnaires**

The time lag between the first and second team rater questionnaires was four months. Although slightly shorter than time frames adopted in other team research (e.g. Anderson and West (1998), used six months), this still allowed a sufficient time lag between ratings for short term performance effects to occur (Mitchell & James, 2001). A clear time frame was

also specified in relevant questions in both the team rater and team member questionnaire. For example, in the team member self-validation questions, respondents were asked to reflect on their team during the past six months. Similarly, in the second team rater questionnaire, raters were asked to consider how the team had performed during the past four months. Specifying such specific time frames ensured that this issue was not simply left to the assumption of the respondent, but was consistent across the dataset (Van de Ven & Ferry, 1980).

### 5.7.7 Feedback reports

Each participating team which provided sufficient team-level data received a team feedback report detailing their key results for the team (see Appendix B.9 for an example). The report compared each team's mean scores from the questionnaire with the average team scores in the sample. The report also included suggestions for development on each of the real team dimensions. At the end of the project, the Head of Organisation Development who was the key contact at the sample 2 organisation also received a final report which detailed the overall findings from the research, again with specific suggestions for development at both the team and organisational level. In order to maintain confidentiality, this report is not provided here.

### 5.7.8 Response rate

#### 5.7.8.1 Individual level

A total of 843 surveys were distributed to the 74 teams which initially agreed to participate. 639 completed questionnaires were completed and returned, providing a 75.8% response rate.

**Table 5.4: Respondent demographics (sample 2)**

	N	Range	Min	Max	Mean	S.D
Respondent's age	517	50	20	70	41.45	11.17
Tenure in team (in months)	379	367	1	368	54.25	59.80
Tenure in organisation (in months)	410	509	1	510	133.59	120.24

Table 5.4 provides some demographic information about the respondents. 54.2% of the sample was female, 32.3% was male, and 13.5% did not disclose their sex. 63.8% of respondents were white, 18.7% were of a black or minority ethnic background, and 17.5% did not disclose their ethnicity. Respondents represented all levels of staff grade and directorate.

270 respondents (42.3%) reported that they did not belong to any other work teams within the organisation, while 251 (39.3%) reported multiple team membership.

### 5.7.8.2 Team level

During the data collection process, seven teams dropped out of the project, due to lack of interest, time and/or commitment from other members of the team. Further, data was only considered for team-level analysis if team members had been working for their team for at least 3 months, to ensure that they were familiar enough with the team to answer reliably about the team's processes and characteristics. Consequently, 7 cases were removed from the dataset. Following a selection ratio of .32 (Dawson, 2003), of the remaining 67 teams, 63 provided sufficient data from team members. This resulted in 594 individual cases being aggregated to the team level for analysis.

**Table 5.5: Team demographics (sample 2)**

	<b>N</b>	<b>Range</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>S.D</b>
Team size	63	32.00	4.00	36.00	11.49	7.30
Frequency of team meetings (per month)	63	14.84	0.16	15.00	2.03	1.99
Membership stability	63	4.33	0.00	4.33	0.83	0.86

**Team size, meeting frequency and membership stability.** Table 5.5 outlines the descriptive statistics related to team size and team meeting frequency. The large range on both variables indicates that both team size and the average number of meetings a team held in a typical month varied considerably across the participating teams. Team membership stability was assessed by taking the average score between team members on the number of people who had left the team during the past six months. With the exception of 1 team which saw an average of 4.33 members leave during the past six months, most of the teams in the sample reported a highly stable team composition, with an average loss of less than 1 member per team in the past six months.

**Team age and status.** With regards to team age, 3 teams (4.8%) were less 1 one year old, 1 team (1.6%) was between 1 and 2 years old and 59 teams (93.6%) were more than 2 years old. 57 teams (90.5%) were permanent, 5 teams (7.9%) were temporary, and 1 team did not disclose their team's status. Therefore, other than some small exceptions, all of the participating teams were reasonably established and mature in their organisational setting.

**Team leadership.** Leadership was assessed using a single item by West et al. (2003) which measured leadership clarity using 5 categories. 45 teams (71.4%) indicated that they had a clear individual leader in their team, 1 team (1.6%) indicated that there was conflict over who led/coordinated their team, 10 teams (15.9%) indicated a number of people lead/coordinated their teams, and for 7 teams (11.1%) a dominant category of leadership between team members could not be clearly established.

**Questionnaire mode.** All members of a participating team completed the questionnaire using the same mode (either online or paper). 46 teams (76.6%) completed the questionnaire using the online method, and 14 (23.3%) used the paper-based method. A one-way analysis of variance (ANOVA) showed that there were no significant differences between these two groups on the main variables of interest in this thesis, including team realness (all *F*-tests were non-significant).

## 5.8 SAMPLE 3

### 5.8.1 Research design

A longitudinal design was adopted to collect questionnaire data from team members over three points in time. The reduced twelve-item version of the real team scale (see chapter 6, validation studies 1 and 2 for a full explanation) was included in a larger questionnaire which was not designed by the researcher at hand.

### 5.8.2 Research setting

Over 300 postgraduate students enrolled on a postgraduate organisational behaviour (OB) module at a UK University were approached for participation. The students were all registered on full time or part time MBA or MSc programmes and were allocated into teams at the beginning of the academic term to work together on an assignment for the OB module. Each team consisted of between five and seven individuals who worked together over the course of an academic term on a group coursework assignment. As with sample 1, the teams were task-orientated project teams. During the ten week module, each team had to work together on a specified task. Their task was to use a variety of OB theories to explain, analyse and improve the design of a specific job, in a 3000 word written assignment. The teams were self-managing and had complete discretion over what sort of job they analysed, what theories they incorporated, and how they structured the assignment. The group assignment was

submitted at the end of week 7 on the 10 week course. At the end of the module, 40% of the students' assessment was based on their performance in this group assignment.

With regards to generalisability of findings, it is again important to consider the applicability of a given sample to the sample for which a measure is intended (Hinkin, 1995). Similar arguments can be made to those proposed for sample 1. Although these were student teams, participants were all enrolled on business related courses, worked together for a significant proportion of time, and were incentivised to work cooperatively together given that their final mark on the module was at stake. The teams were working on a complex and engaging interdependent task that had personal relevance to them, like most teams in organisations (Eby, Meade, Parisi & Douthitt, 1999). Further, given that sample 3 comprised of MBA and MSc students, it is arguable that the majority of participants are also likely to have had a degree of real work experience since their undergraduate study.

### **5.8.3 Access and ethics**

As has already been outlined, for sample 3, the real team scale was incorporated in a wider team member questionnaire which formed part of a separate large scale study. Therefore, the design of the research, permission to access the sample and ethical approval were all negotiated by a third party with the Aston Business School Research Ethics Committee.

### **5.8.4 Procedure**

As discussed, the design of this study was determined by a third party, and the researcher therefore had no influence over the research design process. However, a brief overview will be outlined in the following sections.

Team member questionnaires were completed at week three, week five and week eight of the 10 week course. Given that temporal considerations are becoming increasingly important in the team development literature (Kozlowski et al., 1999), this longitudinal design allowed the researcher to explore the stability of the real team measure over time, as team members became increasingly familiar with one another. At week 8 of the course, each participating team was provided with a brief feedback report, outlining their key scores on a number of variables, including their team level score on the real team scale. However, they received this feedback report after the submission of their group assignment, meaning that the

feedback in no way impacted on group processes before the completion of their assessed group task.

### **5.8.5 Participants**

Each team had between four and seven members, with all teams comprising both genders, and at least two nationalities. Again, this demographically diverse distribution reduced the need to include such variables as controls, thus optimising degrees of freedom in the statistical analysis.

### **5.8.6 Team member questionnaire design**

As discussed, the questionnaire was designed for a separate research study. Only the inclusion of the reduced real team scale is relevant for this thesis. Thus, the final twelve-item version of the scale was included (see chapter 6, section 6.3.7), using a 5-point response scale (1 = *strongly disagree*, 5 = *strongly agree*).

### **5.8.7 Response rate**

At time 1, the sample comprised of 311 individuals in 55 teams. At time 2, the sample comprised of 305 individuals from the same 55 teams, and at time 3, the sample comprised of 315 individuals, again from the same teams. Following Dawson's selection ratio (2003), sufficient team-level data was collected from all 55 teams. With regards to actual team size, 11 teams (21.2%) had 7 team members, 26 teams (50%) has 6 team members, 9 teams (17.3%) has 5 teams members, and 6 teams (11.5%) had 4 team members. As these teams were formed for the purposes of the module, they were all of the same age.

## **5.9 DATA PREPARATION**

Prior to any statistical analysis, the datasets from all samples were checked for missing data and data normality. Missing data poses a pervasive problem in data analysis. Using missing values analysis (MVA) in SPSS, the researcher checked for both the level and the pattern of missing data for the real team scale in each dataset (17 items for samples 1 and 2, twelve items for sample 2). For all samples, results indicated that there were no items from the real team scale with 5% or more missing values. Further, Little's MCAR test (1988) indicates whether the data are missing completely at random. For samples 1, 2 and 3, the statistically

non-significant results (sample 1,  $p = .570$ ; sample 2,  $p = .290$ ; sample 3 (t1),  $p = .684$ ; sample 3 (t2),  $p = .867$ ; sample 3 (t3),  $p = .971$ ) indicate that the probability that the pattern of missing data diverges from randomness is greater than .05 (Tabachnick & Fidell, 2007). Thus, it can be inferred that the data point is missing completely at random (MCAR). Overall, given that less than 5% of data are missing in a random pattern in five large datasets this was not deemed as a serious problem which would compromise the research findings.

With regards to outliers, the data were visually examined, and histograms explored to identify any outlying scores. Obscure values were also not accounted for when the researcher manually aggregated some of the team level constructs, such as team meeting frequency and membership stability. Variables were also assessed on the basis of univariate statistics prior to analysis (see chapter 6, section 6.3.2).

## **Chapter 6: Validation studies 1 and 2**

### **6.1 CHAPTER SUMMARY**

This chapter focuses on the first two validation studies outlined in chapter 5. Validation study 1 details the initial generation of the real team scale, including item generation, the use of existing items and cognitive testing on an initial item pool. Following this, validation study 2 is primarily concerned with the psychometric properties of the new scale. It details an initial investigation into the structural validity of the new measure using exploratory factor analysis on individual level data from both samples 1 and 2. Initial reliability estimations for the 17 item scale from both samples are also reported. Following this, confirmatory factor analysis techniques are used to refine and re-test the second-order model, further establishing the structural and content validity of the real team scale, which is consequently reduced to twelve items. Finally, the psychometric properties and test re-test reliability of the twelve-item scale are reported using three sub-sets of data from sample 3.

### **6.2 VALIDATION STUDY 1**

#### **6.2.1 Item generation**

The generation of items is a critical step in the development of a reliable and valid measure. As theory is a great aid to clarity, it is essential that a scale is grounded in a number of substantive theories which underpin the phenomenon of interest (DeVellis, 2003). Following the guidelines of Hinkin (1998) and Cronbach and Meehl (1955), the first step involved in the development of the real team scale involved establishing content validity. Content validity is of primary concern during the item generation phase and is concerned with whether a scale samples all of the relevant or important domains of a concept, without containing any extraneous content. As such, content validity is considered as the minimum psychometric requirement in determining the adequacy of a measure, and constitutes the initial step of complete construct validation (Schriesheim et al., 1993).

In a review on scale development practices, Hinkin (1995) identifies two primary approaches to item generation. Firstly, the deductive approach follows a thorough review of the literature, after which a comprehensive definition of the construct under examination is derived, which is grounded firmly in theory. According to Schwab (1980), this definition provides a conceptual guide for the subsequent development of an item pool. Secondly, an

inductive approach may be chosen if there is insufficient theory available regarding the construct of interest. In such cases, researchers may derive their item pool from qualitative data such as focus groups or interviews, whereby relevant individuals are asked to provide descriptions or interpretations about the construct. Their responses are typically analysed using content analysis techniques.

In terms of the scale development at hand, Hackman (2002) points out that the word 'team' can have a variety of different meanings for different people. The term has also become over-used in organisational contexts due to its intuitively appealing associations, and is therefore often used to describe various different types of work unit. Therefore, following an inductive approach, which would involve conducting a qualitative study into what people perceive to be a 'team', would have required a highly intensive and lengthy investigation. Further the results of such a study would have provided a lay-persons interpretation of 'real teams', which are very likely to be ambiguous, context-bound and therefore difficult to draw generic themes from. Therefore, as the aim of this scale was to be as generalisable, valid and theoretically rigorous as possible, the inductive approach was not deemed appropriate. Instead, the researcher pursued a deductive approach to scale development. In order to strengthen the content validity of a scale, it is critical that the construct of interest is grounded in theory. Indeed, the deductive approach is ordinarily used in order to establish content validity (Cronbach & Meehl, 1955). According to Hinkin (1995), before developing a psychometrically sound scale, a clear, operational definition of the focal construct is needed. As previously discussed, given the wealth of team definitions and theory available in the literature, the researcher carried out an extensive review of published definitions and measures of teams. Using content analysis techniques, the definitions and measures were examined and coded for their component sub-dimensions in relation to the posited six-factor real team model. Consequently, a clear definition of real teams was established which provided the focal construct for the development of the new scale (see chapter 4).

### **6.2.2 The use of existing items**

With regards to initial measure development, the researcher firstly examined an existing instrument, the Aston Team Performance Inventory (West, Markiewicz, & Dawson, 2004) in order to identify any existing sub-scales which could be matched with the sub-dimensions proposed by the real team model. It made methodological sense that items in the new instrument were predominantly drawn from sub-scales in the Aston Team Performance Inventory (ATPI) as the researcher was able to examine a large secondary dataset to assess the

existing psychometric properties of the extracted items. Ten items relating to four of the six real team sub-dimensions were extracted from the ATPI and treated with exploratory factor analysis (EFA) techniques. Before presenting the results of the EFA, the composition of these subscales is described below. For all items, respondents were required to answer on a 5-point likert scale ranging, *1 = strongly disagree* to *5 = strongly agree*.

***Shared objectives.*** Three items elicited information about the clarity, agreement upon and commitment to team objectives;

- *In this team we know what we are trying to achieve*
- *Team members are committed to achieving the team's objectives*
- *We agree in the team about what our team objectives are*

***Reflexivity.*** Two items elicited information about the extent to which a team regularly reviews its objectives and effectiveness;

- *We regularly discuss whether the team is working effectively together*
- *The team often reviews its objectives*

***Interdependence.*** Three items elicited information about the level of task, goal and outcome interdependence within the team;

- *We have to coordinate our work tightly in this team*
- *Members of my team have to communicate closely with each other in order to get the task done*
- *The team task cannot be achieved without the contribution of every team member*

***Autonomy.*** Two items elicited information about the level of perceived autonomy within the team;

- *We decide as a team who will do what in the team*
- *We are free to decide how to carry out the team's tasks*

### **6.2.3 Initial examination of psychometric properties**

Although this set of 10 items did not sufficiently capture the complete conceptualisation of real teams presented earlier in this thesis, existing data collected as part of the ATPI allowed the researcher to explore the psychometric properties of these ten items to assess their suitability for inclusion in the scale. Existing recent data from 1005 respondents working within manufacturing and healthcare teams was firstly examined using exploratory factor

analysis to test the adequacy of the scale. Principal axis factoring with an oblique rotation (direct oblimin) was used, thus allowing for correlations among factors (Fabrigar, Wegener, MacCallum, & Strahan, 1999). It was expected that the sub-scales captured above would load onto four separate factors, therefore providing initial support for four sub-dimensions which characterise real teams. Results from the pattern matrix displayed in table 6.1 indicate that the real team subscales of objectives, reflexivity, interdependence and autonomy by and large load onto four separate factors.

**Table 6.1: Principle axis factor analysis of ATPI data; pattern matrix, oblique rotation.**

	<b>Shared objectives</b>	<b>Reflexivity</b>	<b>Inter-dependence</b>	<b>Autonomy</b>
1. In this team we know what we are trying to achieve ( <i>objectives</i> )	<b>-.81</b>	-.01	.06	.01
2. Team members are committed to achieving the team's objectives ( <i>objectives</i> )	<b>-.54</b>	.18	.03	.08
3. We agree in the team about what our team objectives are ( <i>objectives</i> )	<b>-.42</b>	<b>.38</b>	.04	.11
4. We regularly discuss whether the team is working effectively together ( <i>reflexivity</i> )	.03	<b>.64</b>	.05	.10
5. The team often reviews its objectives ( <i>reflexivity</i> )	-.17	<b>.75</b>	.01	.00
6. We have to coordinate our work tightly in this team ( <i>interdependence</i> )	-.10	.02	<b>.62</b>	-.06
7. Members of my team have to communicate closely with each other in order to get the task done ( <i>interdependence</i> )	.10	.10	<b>.68</b>	-.05
8. The team task cannot be achieved without the contribution of every team member ( <i>interdependence</i> )	-.05	-.08	<b>.42</b>	.11
9. We decide as a team who will do what in the team ( <i>autonomy</i> )	.10	.14	.05	<b>.68</b>
10 We are free to decide how to carry out the team's tasks ( <i>autonomy</i> )	-.10	-.04	-.19	<b>.51</b>

A closer inspection indicated that one of the objectives items cross loaded onto shared objectives and reflexivity factors, suggesting a small degree of conceptual overlap between these two sub-dimensions. This overlap can be explained by looking at the item itself, which probes the extent to which a team agrees upon their objectives. As one of the reflexivity items is also concerned with team objectives, asking to what extent a team reviews them, it is understandable why respondents may have answered these items in a similar way. Indeed, the process of reviewing team objectives is likely to involve establishing agreement between team members about what needs to be achieved. At this stage of the scale development however, given the slightly stronger loading of the item onto the shared objectives factor, the researcher decided to retain the item within the scale. However, consistent with the theory-based

expectation of an overarching real team construct, the scree plot suggested that one general factor was underlying the data, explaining the majority of the variance. The first factor accounted for 38% of the total variance and had an eigenvalue of 3.78. Also supporting the presence of an overriding real team factor was the moderate to high intercorrelations between the factors (coefficients ranged between .3 and .5). Therefore, at this stage of the scale development, given the imperative of ensuring that the new instrument comprehensively reflects all of the aspects in the theoretical definition of real teams, the researcher decided to maintain all of the existing items within the scale, to explore how they each behaved psychometrically in subsequent datasets.

The internal consistency of this initial item set was also explored. The term reliability refers to the consistency of a set of results (Foster, 1998). By comparing participants' scores on any individual item with their total score across all items, one can ensure that all items of a scale are tapping into the same overall latent variable. The reliability of the ten extracted ATPI items was also assessed using Cronbach's alpha. As the Cronbach's alpha coefficient was above 0.7 ( $\alpha = .803$ ), the initial scale demonstrated satisfactory internal consistency (Howitt & Cramer, 2002).

#### **6.2.4 Development of new items**

Despite these encouraging initial findings, the measure remained incomplete from a theoretical stance, as it did not capture the two further sub-dimensions used to define real teams in this thesis; boundedness and specified roles. Therefore, the researcher proceeded to write a number of new items for these sub-dimensions. Given that scale development recommendations state that one should start with a large pool of items that are all potential candidates for eventual inclusion in the scale (DeVellis, 2003), a number of new items were also written for the other four sub-dimensions captured in the ATPI. Indeed, over-inclusivity is most desirable at this point of the scale development process as scales with too few items can typically lack internal consistency, content validity and test-retest reliability (Kenny, 1979; Nunnally, 1967). In anticipation that the ratio of items developed to those retained would be roughly 2:1 (Hinkin, 1998), the aim at this stage was to produce twenty items for initial testing, incorporating between two and four items per sub-dimension. This cut-off was imposed to ensure that the scale would not be so long as to create problems with response bias or respondent fatigue (Anastasi, 1976) and would not tap into more than one overall conceptual dimension. Following scale development recommendations (DeVellis, 2003; Hinkin, 1995; Nunnally & Bernstein, 1994), various considerations were made in the wording

of the new items. Firstly, because the new scale was designed for use within all types of teams across various levels of the workforce, care was taken to use straightforward, unambiguous wording. The researcher also ensured that the items were not exceptionally lengthy or complex and were similar in structure.

Ensuring that the scale would capture team level, as opposed to individual-level constructs was also critical in selecting and writing the items. Multi-level theory (Kozlowski & Klein, 2000) suggests that higher-level phenomena, in this instance team realness, can emerge from the social psychological interactions, behaviour, affect and cognition among individuals. Together, team members share knowledge and information, communicate their moods and emotions, exchange ideas, and work closely to perform acts and execute tasks. Over time, these interaction dynamics stabilise and team members develop identical or compatible cognitive representations of their team (Kozlowski & Klein, 2000). Given that the theoretical level of the new measure was the 'team', the referent used in the item wording in the new scale was also the team (e.g. '*We agree in the team about what our team objectives are.*'), thus reflecting a shared group property.

Another consideration in the development of new scale items is the issue of negatively worded or reverse-scored items, which have typically been used to overcome bias response patterns (Idaszak & Drasgow, 1987). However, recent research has shown that the disadvantages of oppositely-worded items typically outweigh their proposed benefits (Currey, Callahan & DeVellis, 2002). Indeed, reverse-score items have been shown to add systematic error to a scale (Jackson, Wall, Martin & Davids, 1993), and low item loadings in comparison to positively worded items on the same factor (Hinkin, 1995). Schriesheim & Hill (1981) also argued that the reverse scoring of items can reduce the validity of survey responses. It also made intuitive sense to avoid writing negatively worded items, given that all of the ATPI items were already positively worded. Therefore, all new items written for inclusion in the new scale were also worded positively. With regards to the scaling of items, a 5-point likert scale was chosen. Likert-type scales not only generate sufficient variance among cases, but also allow for the measurement of a concept of a continuum. Indeed, one of the aims of this scale development was to move away from the dichotomous response scale used in the NHS study presented in chapter 3, and thus overcome the ambiguity related to the trying to measure an inherently continuous variable.

### **6.2.5 Cognitive interviews**

At this stage, the item pool consisted of 20 items in total. This item pool was subjected to cognitive interviewing (see Appendix C.1 for the cognitive interview schedule). Interviewees comprised an opportunistic sample, and consisted of six PhD students who were studying in the area of organisational behaviour. Each interview lasted for approximately five and ten minutes and probed the readability and general meaning of the item pool. Results indicated that there were no fundamental problems with the scale, and therefore it remained as it was.

### **6.2.6 Face and content validity assessment**

The same item pool was then subjected to a face validity assessment by three department members who were experts in the area of team research. The experts were asked to identify any items which did not appear to fit into one of the six real team sub-dimensions. The wording of each of the items was also closely scrutinised. Three items were identified as being problematic and were subsequently removed due to their conceptual ambiguity.

At this stage, the researcher simultaneously carried out a content validity assessment of the item pool. Five subject matter experts (PhD students who were familiar with research on teams) were asked to carry out a short sorting task, which required them to assign each item blindly to one of the six real team sub-dimensions. After assigning an item to a category, the experts were also asked to rate how difficult they found the assignment, using a 5 point likert scale. Five lay-persons who had no background in organisational behaviour were also asked to complete the same task. This was mainly to ensure that each item was written in a simple format, whereby it was clear to a layperson what dimension was being reflected. The materials used for the item sorting task can be found in Appendix C.2. Hinkin (1998) recommends that a minimum correct item classification of 75% be required to provide evidence of content adequacy. Therefore, the researcher decided that items which were assigned to the correct a priori category more than 75% of the time should be retained for further investigation. Consequently, all items were retained.

Overall, based on the results of the cognitive interviews, face validity assessment and item sorting task initial assessments, 17 items remained in the scale for further testing and refinement. See Appendix C.3 for the retained items listed under their respective real team sub-dimension.

## 6.3 VALIDATION STUDY 2

### 6.3.1 Model exploration strategy

Factor analysis techniques are used to inform evaluations of score validity, thus confirming whether a given scale actually measures what it claims to be measuring (Thompson, 2004). Factor analysis can be either exploratory or confirmatory. The goal of exploratory factor analysis (EFA) is to summarise data by grouping together correlated variables, and tends to be seen as the historical precursor to confirmatory factor analysis (CFA) (Thompson, 2004). EFA allows one to explore the relationship between measured variables. It does not require the researcher to specify their expectations regarding the nature of underlying structure or the number of factors and is usually performed in the early stages of research to aid the consolidation of variables (Tabachnick & Fidell, 2007). Conversely, CFA is a more recent and sophisticated technique (cf. Jöreskog, 1969) which is only appropriate when a researcher has a clear and theoretically driven model which specifies the number of factors, whether these factors are correlated, and which variables reflect which factors (Thompson, 2004). Given that in this thesis, a priori structure of factors is hypothesised by the researcher, one might ask why EFA is necessary at all. Indeed, this issue has been the source of an ongoing debate in the literature for many years (see Brannick, 1995; Hurley et al., 1997; Kelloway, 1995). However, it is generally agreed that EFA and CFA should be viewed as complementary techniques, and that EFA provides a valuable tool when used in the anticipation of confirmatory techniques (Maruyama, 1997). In a Monte Carlo simulation, Gerbing and Hamilton (1996) also argued that EFA can enhance model identification by effectively linking variables with factors, thus ensuring that the correct model structure is specified for cross-validation in CFA. Thus, EFA allows for a frank exploration of the data before more stringent theoretical assumptions are imposed at the confirmatory stage. Indeed, a common analytical technique adopted during the development of a new scale is to split a dataset into two or three random sub-samples, using the first subsample for EFA of the factor structure, and the remaining subsample(s) to confirm this structure with CFA (Patterson et al., 2005).

Given that at this stage the real team scale had not yet been tested in its complete form, the researcher chose to treat the data from sample 1 with EFA to gain an initial insight into the underlying factor structure. The 311 cases in sample, along with low levels of missing data, provided a good sample size for factor analysis (Comrey & Lee, 1992). Following this, sample 2 was split into three random subsamples, with 213 cases in each. The first subsample was again treated with EFA, and results were compared to those from sample 1 to identify

whether there were any substantial differences which might have been attributable to the nature of the sample (i.e. student teams versus organisational teams). The real team model was then tested using CFA on subsample 2. The item pool was then defined using a number of theoretical and statistical criteria. The final refined model was then re-tested using CFA on subsample 3. Reliability analysis was also carried out at each of the stages. Following this, the shortened version of the real team scale was re-tested over three time periods with a postgraduate student team sample (sample 3). This not only allowed for further validation of the item pool, but also allowed the researcher to explore the test-re-test reliability of the twelve-scale. Each stage will now be discussed in more detail below.

### **6.3.2 Univariate statistics (all samples)**

Following scale development recommendations (Hinkin, 1995; 1998), the univariate statistics of the item pool from each sample was firstly examined. The skewness and kurtosis of the variables was assessed in order to screen for data normality (DeCarlo, 1997; Nunnally, 1978). According to Tabachnick & Fidell (2007), when a variable's mean is not in the centre of the distribution (i.e. is not asymmetrical) then the variable is skewed. Kurtosis, on the other hand, relates to the peakedness of the distribution, whereby variables with non-normal kurtosis have a distribution that is either too flat or too peaked. Normal distribution is evident when the values of skewness and kurtosis are zero. Descriptive statistics and item correlations for the initial 17-item real team scale from samples 1 and 2 can be found in Appendix C.4. Although data transformation was not deemed necessary, item 'ob1' showed consistently higher skewness and kurtosis than other items in both datasets, suggesting that this item could be a candidate for deletion during scale refinement. However at this stage, the item was retained in order to explore how it behaved alongside the other items in factor analysis. Descriptive statistics and item correlations for the subsequent twelve-item scale tested in sample 3 can be found in Appendix C.4. As data collection from this sample followed a longitudinal design, the three tables represent the data collected at three time points. Again, based on indications of data normality, data transformation was not deemed necessary.

### **6.3.3 Exploratory factor analysis**

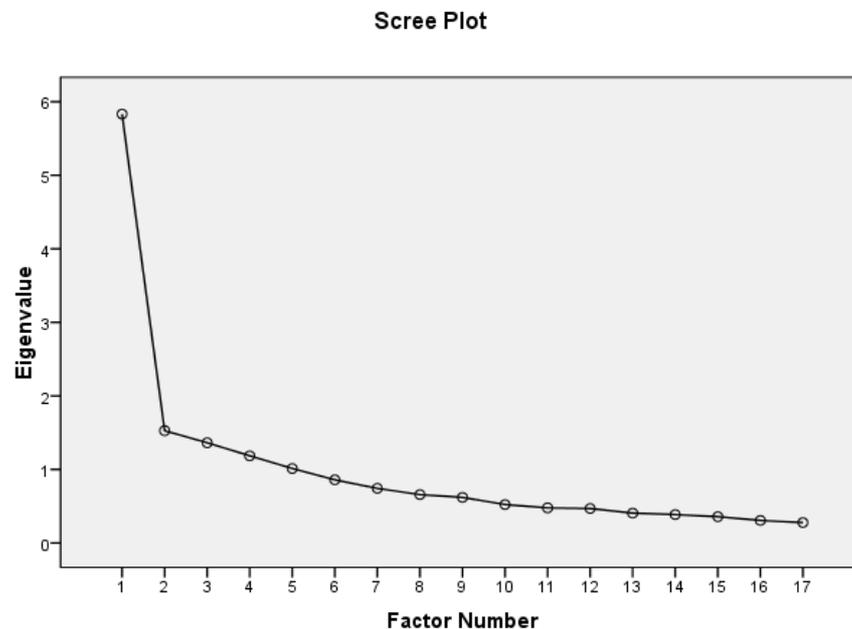
#### ***6.3.3.1 Sample 1 data***

The initial 17-item real team scale was subjected to exploratory factor analysis (principal axis factoring) with an oblique rotation (direct oblimin), allowing for correlations among factors (Fabrigar et al., 1999). This method was deemed as most relevant given that the aim of this

initial analysis was to explore the number of latent factors underlying the real teams construct, and that it was anticipated that the factors would correlate (Tabachnick & Fidell, 2007).

Six factors were extracted, each assuming to represent the six real team sub-dimensions. An inspection of the pattern matrix (see table 6.2) indicated that, with the exception of item 11 (aut1) there were no cross loadings between the six real team sub-dimensions. However, an inspection of the scree plot suggested that one general factor was underlying the data, explaining the majority of the variance. A steep break in the scree plot between the first and second factor (eigenvalues of 5.83 and 1.53, respectively), indicated a one-factor solution (see figure 6.1). The first factor accounted for 31.7% of the total variance, with the subsequent five factors explaining 6.61%, 4.79%, 4.08%, 2.78% and 2.12% respectively. Although item 11 (aut1) did not load sufficiently onto the autonomy sub-dimension, the researcher retained the item for EFA using data from sample 2, to see if this problem was common across both sample contexts. Indeed, the prescribed nature of the business game task performed by teams in sample 1 may have unduly influenced the responses to this particular item.

**Figure 6.1: Scree plot from exploratory factor analysis (sample 1)**



**Table 6.2: Principle axis factor analysis (sample 1); pattern matrix, oblique rotation**

	<b>Shared objectives</b>	<b>Reflexivity</b>	<b>Inter-dependence</b>	<b>Autonomy</b>	<b>Boundedness</b>	<b>Specified roles</b>
1. In this team we know what we are trying to achieve (ob1)	<b>.66</b>	-.09	-.09	-.01	.12	-.00
2. Team members are committed to achieving the team's objectives (ob2)	<b>.66</b>	-.13	.07	.03	.06	.05
3. We agree in the team about what our team objectives are (ob3)	<b>.80</b>	-.03	-.03	.04	-.01	-.04
4. In this team we have a shared purpose (ob4)	<b>.59</b>	-.07	.04	-.01	-.06	.12
5. We regularly discuss whether the team is working effectively together (ref1)	.23	<b>-.51</b>	.26	-.02	-.11	-.04
6. The team often reviews its objectives (ref2)	.10	<b>-.73</b>	.04	.06	-.10	.09
7. We regularly reflect upon team performance and how it could be improved (ref3)	.04	<b>-.67</b>	-.03	.07	.09	.11
8. We have to coordinate our work tightly in this team (int1)	.22	-.15	<b>.32</b>	.01	.11	-.08
9. Members of my team have to communicate closely with each other to get the job done (int2)	-.02	.01	<b>.66</b>	-.00	.06	-.05
10. The team task cannot be achieved without the contribution of every team member (int3)	-.11	-.05	<b>.61</b>	.06	-.08	.014
11. We decide as a team who will do what in the team (aut1)	<u>.32</u>	.12	.13	<b>.24</b>	-.22	<u>.44</u>
12. We are free to decide how to carry out the team's tasks (aut2)	.12	.06	.12	<b>.54</b>	-.14	-.00
13. In this team we set our own goals (aut3)	-.07	-.09	-.05	<b>.61</b>	.09	-.03
14. We are formally recognised as a team within our organisation (bou1)	.18	-.01	.08	.30	<b>.43</b>	.16
15. It is clear who the members of our team are (bou2)	.22	.13	.14	-.01	<b>.36</b>	.30

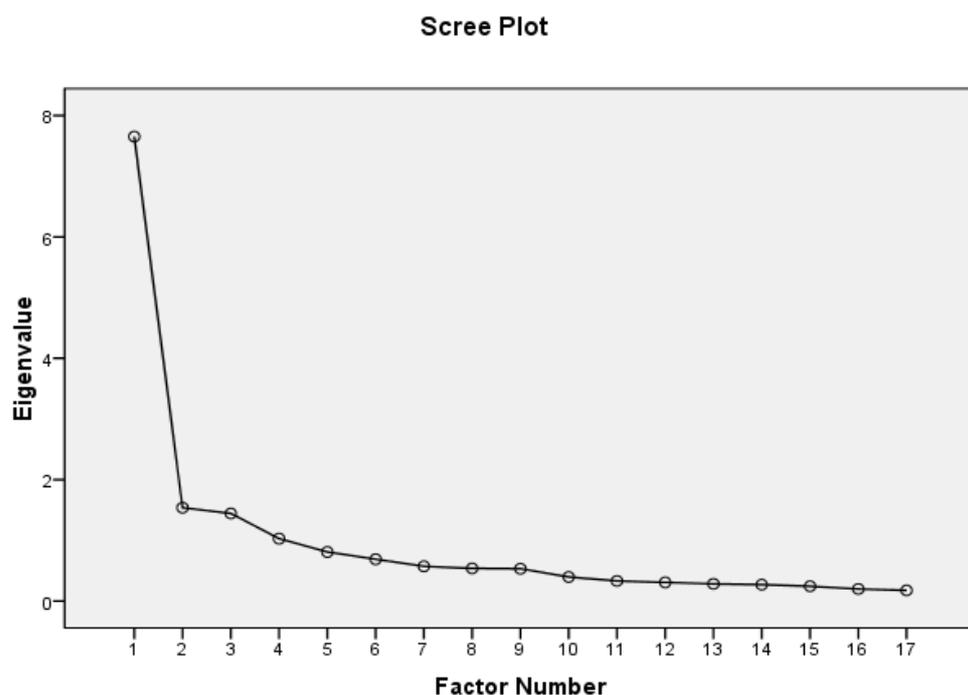
16. Members are clear about their own role within the team (rol1)	.03	-.03	.04	-.05	.09	<b>.82</b>
17. Members are clear about the roles of other team members (rol2)	-.05	-.13	-.02	-.02	.00	<b>.73</b>

Further, the Bartlett test of sphericity was significant ( $p < .000$ ), indicating that the 17-item matrix was significantly different from a matrix of essentially uncorrelated items. Further, the Kaiser-Meyer-Olkin (KMO) value was 0.88. It is argued that values above 0.6 are required for good factor analysis solutions (Tabachnick & Fidell, 2007). Finally, an internal consistency was calculated using Cronbach's alpha ( $\alpha$ ). The alpha value for the 17-item scale was .87. Nunally (1978) suggested that alpha values of above .70 are acceptable, with values between .80 and .90 being very good.

### 6.3.3.2 Sample 2 data

The first subsample from the organisational dataset was also treated with the same form of EFA. Again, six factors were extracted, each assuming to represent the six real team sub-dimensions. An inspection of the pattern matrix (see table 6.3) indicated that there were no cross loadings between the six real team sub-dimensions. However, an inspection of the scree plot again suggested that one general factor was underlying the data, explaining the majority of the variance. A steep break in the scree plot between the first and second factor (eigenvalues of 7.65 and 1.54, respectively), indicated a one-factor solution (see figure 6.2). The first factor accounted for 43.2% of the total variance, with the subsequent five factors explaining 7.13%, 6.17%, 3.63%, 2.93% and 2.18%. The previous problem relating to the cross loading of 'aut1' was also no longer apparent in the organisational teams sample.

Figure 6.2: Scree plot from exploratory factor analysis (sample 2)



**Table 6.3: Principle axis factor analysis (sample 2); pattern matrix, oblique rotation**

	<b>Shared objectives</b>	<b>Reflexivity</b>	<b>Inter-dependence</b>	<b>Autonomy</b>	<b>Boundedness</b>	<b>Specified roles</b>
1. In this team we know what we are trying to achieve (ob1)	<b>.79</b>	.03	.03	-.02	.06	-.01
2. Team members are committed to achieving the team's objectives (ob2)	<b>.81</b>	-.05	-.06	.01	.10	.09
3. We agree in the team about what our team objectives are (ob3)	<b>.75</b>	.09	.14	.10	-.14	-.02
4. In this team we have a shared purpose (ob4)	<b>.63</b>	.12	.07	.01	.09	.06
5. We regularly discuss whether the team is working effectively together (ref1)	.04	<b>.87</b>	-.06	.04	-.03	-.02
6. The team often reviews its objectives (ref2)	.12	<b>.70</b>	.06	-.06	-.05	.14
7. We regularly reflect upon team performance and how it could be improved (ref3)	-.04	<b>.88</b>	.01	.00	.06	-.02
8. We have to coordinate our work tightly in this team (int1)	.07	-.05	<b>.90</b>	-.05	-.03	.15
9. Members of my team have to communicate closely with each other to get the job done (int2)	.08	.07	<b>.53</b>	.13	.09	-.05
10. The team task cannot be achieved without the contribution of every team member (int3)	.04	.15	<b>.40</b>	.11	.15	-.17
11. We decide as a team who will do what in the team (aut1)	-.09	.14	.13	<b>.71</b>	.06	.03
12. We are free to decide how to carry out the team's tasks (aut2)	.10	-.06	-.06	<b>.75</b>	-.01	-.07
13. In this team we set our own goals (aut3)	-.01	-.00	.02	<b>.61</b>	-.01	.13
14. We are formally recognised as a team within our organisation (bou1)	.03	-.04	-.02	-.02	<b>.72</b>	.03
15. It is clear who the members of our team are (bou2)	.06	.08	.10	.05	<b>.49</b>	.10

16. Members are clear about their own role within the team (rol1)	.07	.06	-.01	.04	.13	<b>.74</b>
17. Members are clear about the roles of other team members (rol2)	.09	.06	.10	.11	.04	<b>.71</b>

The inter-correlations between the six factors are displayed in table 6.4. Moderate to strong correlations between the six factors again support the notion of an over-riding real team factor.

**Table 6.4: Factor correlation matrix (sample 2)**

Factor	1	2	3	4	5	6
1	1.000					
2	.41	1.000				
3	.66	.37	1.000			
4	.58	.42	.44	1.000		
5	.67	.36	.51	.58	1.000	
6	.53	.31	.60	.52	.46	1.000

Finally, for sample 2, the Bartlett test of sphericity was again significant ( $p < .000$ ) and the Kaiser-Meyer-Olkin (KMO) value was above the recommended level of 0.6 (0.91) (Tabachnick & Fidell, 2007). Given that the overall findings from the sample 2 EFA closely mirrored those from sample 1, the EFA was repeated, specifying a one-factor solution, with the intention of removing any items that had factor loadings of less than .40, as recommended by Hinkin (1998). However, due to consistently moderate to strong loadings of all 17 items onto the first factor, no items were removed at this stage (see Appendix C.5 for factor loadings table).

With regards to internal homogeneity, the alpha value for the 17 item scale with sample 2 was 0.916. Nunally (1978) suggested that alpha values of above .70 are acceptable, with values between .80 and .90 being very good. However, DeVellis (2003) points out that one should consider shortening a scale were values are much above .90, suggesting that the 17 item measure could be reduced.

### **6.3.4 Confirmatory factor analysis, time 1**

To provide additional support for the conceptualisation of team realness as a general global factor, a second-order CFA of the 17 item scale was conducted using AMOS 7.0 SEM program (Arbuckle, 1997). Given that in CFA, multiple models may fit the same dataset, it is best practice to not only test the single postulated model, but also a number of plausible rival models (Thompson, 2000). Therefore, the hypothesised second-order model (representing the

six sub-dimensions of real teams) was tested against a six-factor first order model, a one-factor model (assuming respondents do not differentiate between the sub dimensions, but a real team factor does exist) and a null-factor model (the data does not yield a single factor). Further, the six-factor first order model was tested with both correlated factors and uncorrelated factors. Input for each analysis was based on the covariance matrix of the items, and maximum likelihood estimation methods were used, given that the data was normally distributed (see section 6.3.2). Table 6.5 details the results from the CFA of the initial 17-item scale.

**Table 6.5: Fit indices of confirmatory factor analysis (Time 1)**

	$\chi^2$	Df	$\chi^2/df$	NFI	CFI	TLI	PCFI	RMSEA
Null	2073.87	153	13.56	.00	.00	.00	.00	.24
Six-factors (uncorrelated)	749.72	125	6.00	.64	.68	.60	.55	.15
One-factor	624.80	119	5.25	.70	.74	.66	.57	.14
Six-factors (correlated)	229.06	104	2.20	.89	.94	.90	.64	.08
Second-order model	240.62	113	2.13	.88	.93	.91	.69	.07

Several indices were used to explore model fit. Traditionally reported fit statistics used to report CFA are the  $\chi^2$  significance test and the  $\chi^2$  difference test. Regarding table 6.4, the second-order model yielded a  $\chi^2$  of 240.62, with 113 degrees of freedom ( $p < 0.005$ ). This would suggest that the fit of the data to the hypothesised model is not entirely adequate. However, limitations in the use of chi-square have been widely acknowledged in the literature given that absolute indices are particularly sensitive to sample size (Loehlin, 1992; Byrne, 2001). Researchers have therefore recommended reporting the  $\chi^2 /df$  ratio with ratios below 2.0 indicating a reasonable fit (Buss & Perry, 1992). Further, the  $\chi^2$  difference test is restricted to instances where models are nested, and therefore could not be used to compare the six factors (correlated) model and the second-order model.

Based on the problems associated with the use of  $\chi^2$ , relative fit indices were therefore computed to provide a more robust evaluation of the model fit (Byrne, 1989). These included the normed fit index (NFI; Bentler & Bonnett, 1980), the comparative fit index (CFI; Bentler, 1990) and the Tucker Lewis index (TLI; Tucker & Lewis, 1973). For these indices, closer coefficients to unity indicate good fit, with acceptable levels of fit being above 0.9 (Marsh, Balla & McDonald, 1988). Another common fit measure which is based on the non-central chi-square distribution is the root-mean-square error of approximation (RMSEA; Steiger &

Lind, 1980). With RMSEA, smaller values are to be preferred with values around 0.08 representing reasonable fit, and values around 0.05 representing very good fit (Bryne, 2001).

Based on the CFI, TLI and RMSEA fit indices, both the six-factors (correlated) model and the second-order model demonstrated acceptable levels of fit to the data. However, in both models, the  $\chi^2$  indices to degrees of freedom ( $\chi^2/df$ ) ratios did not fall below 2.0; a condition which is commonly recommended in scale development. Both models also failed to reach the recommended level of 0.9 for the NFI. Therefore, the researcher aimed to improve the fit of the second-order real team model by reducing the item pool.

### **6.3.5 Scale refinement**

Given that during the exploratory and confirmatory stage of factor analysis, none of the 17 real team items demonstrated to be problematic, with the second-order model postulated model also demonstrating a reasonable fit on some fit indices, the researcher decided to collaborate with two experts in team research to reduce the item pool on a theoretical, as well as statistical basis. The process of scale refinement was based on a number of criteria;

1. The item had a strong statistical loading onto the main factor. For the organisational dataset (sample 2), a minimum loading of 0.4 was required (Hair, Anderson, Tatham, & Black, 1995; Hinkin, 1998).
2. The conceptual nature of the item was theoretically core to the respective real team sub-dimension, and was semantically distinct from the other items in that sub-dimension.
3. An examination of reliability coefficients (Cronbach's alpha) demonstrated acceptable levels of internal consistency of the scale.

Based on these conditions, five items were removed from the scale. Justification for the removal of each of these items will now be outlined.

Firstly item 'ob1' (*in this team we know what we are trying to achieve*) was removed given the skewed scores on this item in both datasets (see Appendix C.4 for descriptive statistics from sample 1 and 2 data). For the shared objectives sub-dimension, it was important that the items reflected clarity, agreement and commitment to team objectives. These theoretically core concepts were best captured by items 'ob2' (*team members are committed to achieving the team's objectives*) and 'ob3' (*we agree in the team about what our*

*team objectives are*) which also demonstrated normally distributed scores in the two datasets. The concept of objective ‘clarity’ is implicitly implied in these items, as a team must be clear about their team objectives before they are able to agree upon them and be committed to them. Item ‘ob4’ was also removed from the shared objectives sub-dimension as it more clearly articulated sharedness of the team’s purpose over objective ‘clarity’.

With regards to the reflexivity sub-dimension, ‘ref1’ (*we regularly discuss whether the team is working effectively together*) was removed as theoretically this item captured the definition of reflexivity (Carter & West, 1998; West, 1996, 2000, 2002) less closely than the other reflexivity items. Items ‘ref2’ and ‘ref3’ explicitly captured the concept of reviewing team objectives and team performance, whereas item ‘ref1’ captured such processes less precisely, referring more so to communication frequency within the team.

‘Int 3’ (*the team task cannot be achieved without the contribution of every team member*) was removed from the interdependence sub-dimension due to both its consistently lower factor loadings (see Appendix C.5 for factor loadings table) as well as being less theoretically core than the other two interdependence items. Indeed, although high levels of task and goal interdependence are a key characteristic for real teams, this does not imply that the task is unachievable without a contribution from every single team member. Indeed, in mature teams, team members may be able to compensate for one another in times of absence or crisis. Therefore, the expert panel reviewing the item pool decided that items ‘int1’ (*we have to coordinate our work tightly in this team*) and ‘int2’ (*members of my team have to communicate closely with each other to get the job done*) should be retained to capture interdependence, given that they explicitly refer to the need for close intra-team communication and task related co-ordination between team members.

Finally, with regards to the autonomy sub-dimension, ‘aut1’ (*we decide as a team who will do what in the team*) was removed due to its lower levels of face validity, and poor loading on the penultimate CFA in comparison to the other two autonomy items. Indeed ‘aut1’ was more related to role allocations within a team, which in many teams, is likely to be predetermined by a member’s specific abilities, skills and expertise at the point of recruitment. However, ‘aut2’ (*we are free to decide how to carry out the team’s tasks*) and ‘aut3’ (*in this team we set our own goals*) are more explicitly related to the amount of control and discretion the team has in determining its tasks, goals and course of action – all of which theoretically underpin the concept of autonomy.

Overall this process of refinement resulted in a final twelve-item real team scale, with each of the six sub-dimensions comprising two items. These items and their respective sub-dimensions are as follows:

***Shared objectives***

1. Team members are committed to achieving the team's objectives.
2. We agree in the team about what our team objectives are.

***Reflexivity***

3. The team often reviews its objectives.
4. We regularly reflect upon team performance and how it could be improved.

***Interdependence***

5. We have to coordinate our work tightly in this team.
6. Members of my team have to communicate closely with each other to get the job done.

***Autonomy***

7. We are free to decide how to carry out the team's tasks.
8. In this team we set our own goals.

***Boundedness***

9. We are formally recognised as a team within our organisation.
10. It is clear who the members of our team are.

***Specified roles***

11. Members are clear about their own role within the team.
12. Members are clear about the roles of other team members.

**6.3.6 Confirmatory factor analysis, time 2**

The reduced item pool was subsequently treated with CFA using data from the third sub-sample from the sample 2 organisational data. Again a number of competing models were tested and compared to the second-order model. Results are summarised in table 6.6.

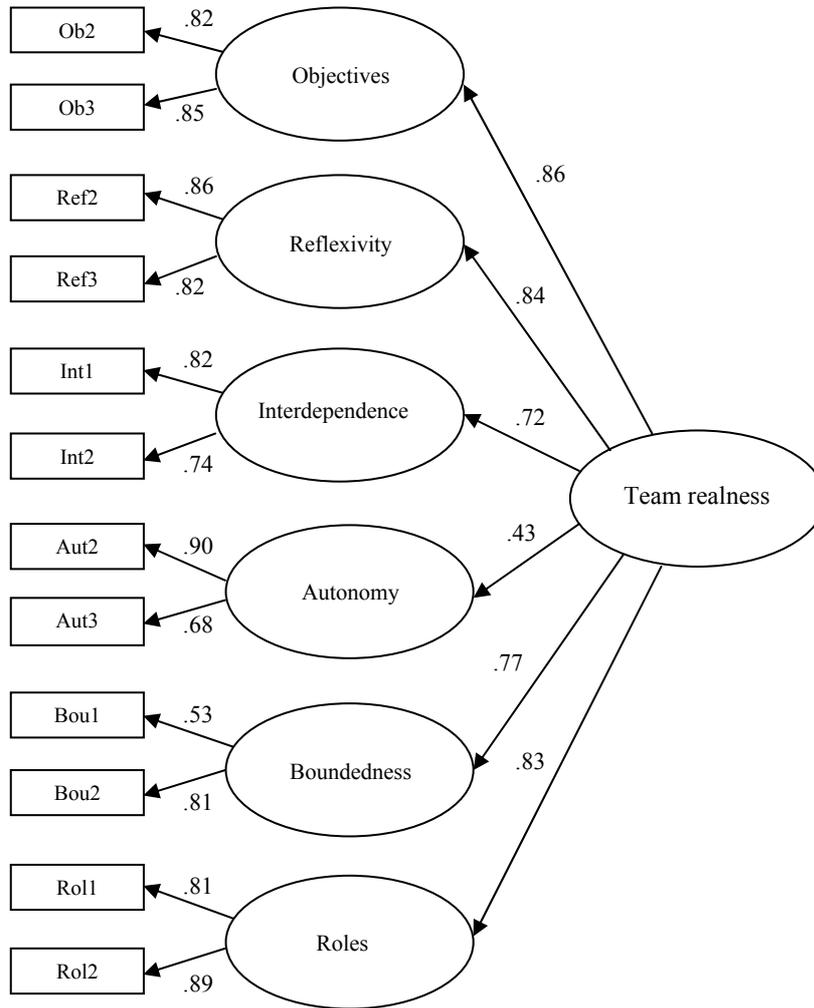
**Table 6.6: Fit indices of confirmatory factor analysis (time 2)**

	$\chi^2$	Df	$\chi^2/df$	NFI	CFI	TLI	PCFI	RMSEA
Null	1179.50	78	15.12	.00	.00	.00	.00	.06
One Factor	322.94	54	5.98	.73	.76	.65	.52	.15
Six Factors (uncorrelated)	498.27	60	8.30	.58	.60	.48	.46	.17
Six Factors (correlated)	60.07	39	1.54	.95	.98	.96	.49	.05
Second-order model	82.35	48	1.72	.93	.97	.95	.60	.06

As previously discussed, good fit is illustrated by  $\chi^2$  indices to degrees of freedom ( $\chi^2/df$ ) ratios which are below 2.0; a condition which was met by both the six factors correlated model and the second-order model. It has also been suggested that a chi-square value two to three times larger than the degrees of freedom represents an acceptable fit (Carmines & McIver, 1981); a condition which was also met by these two models. Again, both models also demonstrated very good fit with NFI, CFI and TLI values all being over the recommended value of 0.9, and RMSEA values being around the recommended level of 0.05. However, in the development of a new theoretical construct, many have argued for the importance of parsimony (cf. Thurstone, 1947). According to Mulaik et al. (1989), when interpreting goodness of fit, the parsimony of the model should always be taken into account. The parsimony-adjusted fit indices (PCFI) is especially useful for comparing models and is calibrated from the CFI, weighing the parsimony of a model against its use of the data in achieving goodness of fit. As PCFI contains corrections for both model complexity and sample size, some researchers advocate it as the fit index of choice (Carlson & Mulaik, 1993; Williams & Holahan, 1994). PCFI values tend to be lower than those obtained for other indices, with Mulaik et al. (1989) considering PCFI indices above .50 as demonstrating adequate fit. As can be seen in table 7.4, this condition was only met by the second-order model, with the six factors correlated model falling short of the recommended level. In combination with the theoretical argument made for the second-order model (see chapter 4), as well as the other fit statistics suggesting very good model fit, the second-order model was deemed as the optimal model of choice, supporting the proposition of an overarching real team second-order factor. The path diagram with standardised regression weights is depicted in figure 6.3. As can be seen, all latent factors load moderately/highly and significantly onto the second-order factor, suggesting that the proposed real team sub-dimensions accurately represents the higher latent construct of team realness. The mean of the first order loadings was 0.74, denoting that an average of 55% of the variance in the first-order factors was

attributable to team realness (James & James, 1989); thus confirming that the conceptualisation of a second-order factor is reasonable.

**Figure 6.3: Path diagram for CFA (sample 2, time 2)**



*Note:* Measurement model showing standardised factor loadings on primary and secondary latent factors (all  $ps < .05$ )

Finally, in terms of internal consistency, the reduced twelve-item scale generated an alpha coefficient of .88, suggesting good reliability (DeVellis, 2003). The reliability analysis also indicated that the alpha value could not be improved by deleting any of the twelve items, suggesting that they all play an important contribution to the theoretical homogeneity of the real team construct.

### 6.3.7 Confirmatory factor analysis, time 3

An important step of scale development involves replication with a new independent sample of participants. As outlined in chapter 5, a third set of data was therefore collected using the

newly reduced twelve-item scale from members of 55 postgraduate teams over three time points (sample 3). Sample 3 generated three subsets of data. The first subsample consisted of 311 responses, the second of 305 responses, and the third of 315 responses. Each subsample was treated with a second-order CFA of the twelve-item scale using AMOS. Results from each subsample are reported in table 6.7.

**Table 6.7: Fit indices of confirmatory factor analysis (Time 3)**

	$\chi^2$	Df	$\chi^2/df$	NFI	CFI	TLI	PCFI	RMSEA
Second-order model (time 1)	110.81	48	2.31	.89	.93	.89	.57	.07
Second-order model (time 2)	118.63	48	2.47	.91	.94	.91	.58	.07
Second-order model (time 3)	101.96	48	2.12	.94	.97	.95	.60	.06

Note: N (time 1) = 311; N (time 2) = 305; N (time 3) = 315.

Data from time 1 provided only adequate fit to the postulated model. Although the CFI was above 0.9, the NFI and TLI did not meet this recommended level. However, as can be seen in table 6.4, at the subsequent two time points, the models demonstrated good fit, with all fit indices reading recommended levels. At times 2 and 3, all of the six first order factors had significant, and moderate to strong loadings onto the second-order factor of team realness. Only at time 1 did the sub-dimension of interdependence have a small loading onto team realness (0.25), indicating a negligible effect size. The mean of the first order loadings at time 2 was 0.70 (time 2) denoting that an average of 49.4% of the variance in the first-order factors was attributable to the team realness factor (James & James, 1989). Similarly, at time 3, 49.8% of the variance in the first-order factors was accounted for by the team realness factor. The path diagrams using standardised regression weights for each of the time periods from sample 3 can be found in Appendix C.6.

Finally, the internal consistency of the scale was checked. Cronbach's alpha ( $\alpha$ ) coefficients at the three time points were 0.77, 0.83 and 0.78 respectively, indicating adequate internal consistency of the twelve-item scale. In terms of test re-test reliability, correlations between the mean scores on the real team scale at three time points are displayed in table 6.8. Although there are no generally agreed upon standards for interpreting the magnitude of effect sizes, researchers have typically followed Cohen's (1988) recommendations. According to Cohen (1988), the operational definitions of the effect size (ES) for correlation coefficients are 0.10 (*small, negligible practical importance*), 0.30 (*medium, moderate practical importance*), and 0.50 (*large, critical practical importance*). Therefore, based on these

recommendations, the correlation coefficients between times 1 and 2, and 2 and 3 indicate adequate test re-test reliability over an eight week period. However, one would not expect the test re-test reliability to be too high, given that teams are self-regulating entities which change and evolve over time (Kozlowski & Ilgen, 2006).

**Table 6.8: Sample 3 test re-test reliability**

Factor	1	2	3
1	1.000		
2	.48**	1.000	
3	.46**	.58**	1.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### 6.3.8 Generalisability

In terms of generalisability, throughout the analysis it was anticipated that the same second-order factor structure should hold for each of the sample populations. Indeed, the fit indices for sample 2 (sub-sample 3) and sample 3 (at time 3, when teams were most established) were almost identical for the twelve-item second-order model (see table 6.9).

**Table 6.9: Fit indices for different samples**

	$\chi^2$	Df	$\chi^2/df$	NFI	CFI	TLI	PCFI	RMSEA
Sample 2 (sub-sample 3)	82.35	48	1.72	.93	.97	.95	.60	.06
Sample 3 (time 3)	101.96	48	2.12	.94	.97	.95	.60	.06

*Note:* Sample included 311 team members from a large public sector organisation and 315 postgraduate students working in project teams

To further explore the generalisability of the measurement model, the same two samples of data were treated with a Multigroup Confirmatory Factor Analysis (MGCFAs). MGCFAs is an extension of CFA which tests the invariance of estimated parameters of two nested models across groups (Cheung & Rensvold, 2002). Firstly, a two-group second order CFA model was estimated, in which all parameters were set free across the two samples of teams (Model A). Next, a series of equality constraints were imposed. Firstly, a model was estimated in which the factor loadings were constrained to be equal across the two groups (Model B). Model C additionally fixed the variance of factors to be the same across groups. Finally, Model D also fixed the covariances and variances of the errors to be the same. The comparison of these four models provides a test of measurement equivalence across the two

groups, whereby once can assess whether the stricter metric invariance conditions in Models B, C and D are met by both samples of teams.

**Table 6.10: Fit indices for multigroup analysis**

	$\chi^2$	Df	$\chi^2/df$	NFI	CFI	TLI	RMSEA
Model A	164.70	96	1.72	.93	.97	.95	.04
Model B	164.70	102	1.62	.93	.97	.96	.04
Model C	164.70	120	1.37	.93	.98	.97	.03
Model D	164.70	138	1.19	.93	.98	.98	.02

As can be seen in table 6.10, the fit indices for each model suggested that the second order measurement model of team realness had acceptable fit within each of the two groups of data. In order to test for measurement invariance in MGCFA, changes in CFI values of 0.01 or less (or alternatively, between 0.01 and 0.02) have been proposed to be indicative of factor invariance across the groups (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). The change in CFI between Model A and each of the competing models (B, C and D) were all 0.01 or less, suggesting that the models are practically equivalent in terms of empirical fit. To summarise, using a single measurement model which constrains the factor loadings, factor variances, and the error variance and covariances to be equal (Model D) across both samples of teams generated the same empirical fit as using two different measurement models across the two samples. Overall, this provides further evidence for the generalisability of the Real Team model.

However, one area is which results were less consistent across the samples related to the interdependence sub-dimension, particularly with regards to sample 3 results. At time 1, the loading of the first order factor of interdependence onto team realness was notably low (0.25). Referring back to the social psychological conceptualisation of interdependence (see chapter 4), this perspective considers both the technological requirements of a task, as well as the social interaction and cooperation requirements needed for a team to successfully meet their collective objectives (e.g. Shaw, 1973). At time 1, teams in sample 3 had only been formed for three weeks, and had met formally during class time on only three occasions. It is therefore arguable that at this early stage of team development, team members did not yet perceive themselves to be particularly interdependent on one another, even though their task was designed in a way which required a degree of interdependence. The improvement of the

interdependence loading onto the real team factor over the two subsequent time point supports this explanation, as perceptions of interdependence subsequently increased. Secondly, the specific task that this sample of teams was carrying out did not necessarily require a high level of technical and sequential interdependence. As described in chapter 5, the task of the sample 3 teams was to produce a written report based on their analysis and application of a particular organisational behaviour theory. It is possible that a team could manage this task by simply dividing it up, delegating sub-tasks to each team member, and pooling individual contributions at the end to form an overall report. This might explain why interdependence accounted for less of the variance in team realness in sample 3, than in the other team samples.

## **6.4 CONCLUSION**

To summarise the overall findings from studies 1 and 2, the development of the real team scale attempted to capture and operationalise the six characteristics of real teams identified in chapter 4; shared objectives, interdependence, reflexivity, autonomy, boundedness and specified roles. An initial item pool was developed following a deductive approach and interrogated using various techniques prior to data collection. A 17-item scale was subsequently tested with two different samples. Data from sample 2 was split into 3 sub-samples for factor analysis. The scale was then reduced to twelve items using a number of theoretical criteria and the second-order model was re-tested with a third sample over three time points. Overall, evidence presented in validation study 2 demonstrates that responses to the twelve-item scale can be explained by these six first order factors, which in turn can be explained by a single second-order factor of team realness. It can therefore be concluded that the final twelve-item real team scale demonstrates consistently acceptable results in terms of its content validity (both in terms of face and structural validity) and reliability.

## **Chapter 7: Validation studies 3 to 7**

### **7.1 CHAPTER SUMMARY**

The aim of chapter 7 was to further explore the validity of the twelve-item real team scale using data from three samples of teams. As all of the analysis presented in this chapter was conducted at the team-level, the chapter opens with a discussion of multi-level theory, with specific attention being paid to the justification of data aggregation. Following this, five separate validation studies are presented. Together these studies explore the concurrent, convergent, discriminant and predictive validity of the real team scale, as well as its six sub-dimensions. Overall, results indicate adequate empirical support for validation of the new measure.

### **7.2 MULTI-LEVEL THEORY AND DATA AGGREGATION**

According to Kozlowski and Klein (2000), aggregation of data to the group level requires justification on both a theoretical and empirical basis.

From a theoretical perspective, in order to justify team-level phenomenon, the construct at hand must have a conceptually parallel meaning at the individual level, so that the linkages among parallel constructs at both levels demonstrate functional equivalence (Kozlowski & Klein, 2000). Multi-level theory suggests that higher-level phenomena, in this instance team realness, can emerge from the social psychological interactions, behaviour, affect and cognition amongst individuals (Allport, 1954; Katz & Kahn, 1966; Kozlowski & Klein, 2000). Together, team members share knowledge and information, reflect on objectives, exchange ideas, work closely to perform acts and execute tasks. Over time, these interaction dynamics stabilise and team members develop similar or compatible cognitive representations of their team (James, 1982; Klimoski & Mohammed, 1994; Kozlowski, Gully, Salas & Cannon-Bowers, 1996). Under group conditions, processes such as leadership (Kozlowski & Doherty, 1989); socialisation (Schneider & Reichers, 1983) and attraction, selection and attrition serve to reduce individual differences and facilitate common perceptions of group climate. As a result, it is argued that when taken as an aggregate, individual perceptions accurately represent higher-level group climates (Schneider & Bowen, 1985). According to Kozlowski and Klein (2000), these cognitive representations combine in a complementary way, whereby the whole is greater than the sum of its parts. These

synergistic outcomes are the very essence that underpins the notion of teamwork. The theoretical justification for conceptualising real teams at the team-level was discussed more fully in chapter 4.

With regards to empirically justifying aggregation of individual-level data to the team-level, interrater reliability coefficients were calculated to demonstrate consensual validity, as measured by  $R_{wg(j)}$  (George & James, 1993; James, Demaree & Wolf, 1984). It has been suggested that  $R_{wg(j)}$  values above 0.70 suggest acceptable consensual validity (cf. Nunnally & Bernstein, 1994). To further justify aggregation, it is also necessary to demonstrate that more variance exists between teams than within teams on a given construct, thus suggesting that responses can be attributed to team membership (Yamarino & Markham, 1992). ICC(1) estimates the extent to which individual level variability on a given construct can be explained by the higher level unit, whereas ICC(2) provides an estimate of the reliability of group means (Bliese, 2000). In order to calculate these intra-class coefficients, data from the twelve-item real team scale was treated with a one-way ANOVA (Chan, 1998). Evidence for discriminant validity is indicated if an ICC(1) index has  $F$ -ratios greater than 1, although researchers commonly accept a significant  $F$ -ratio as justification for aggregation (Klein et al., 2000). Further, ICC(2) values of above 0.50 are indicative of acceptable discriminant validity. Results for the twelve-item real team scale from each sample of data are displayed in table 7.1.

**Table 7.1: Indices of consensual and discriminant validity**

	$R_{wg(j)}$	ICC1	ICC2	$F$ -Value
Team realness - sample 1	0.95	0.20	0.47	1.89**
Team realness - sample 2	0.75	0.23	0.74	3.85***
Team realness – sample 3 (time 1)	0.77	0.08	0.35	1.54*
Team realness – sample 3 (time 2)	0.80	0.22	0.61	2.57***
Team realness – sample 3 (time 3)	0.78	0.28	0.68	3.14***

Sample 1=54 teams; Sample 2=63 teams; Sample 3 = 52 teams; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

The average  $R_{wg(j)}$  index for the real team scale across the samples were all above 0.70 and therefore indicated sufficient consensual validity. The ICC(1) indices for all samples were significant and above the recommended level of unity. ICC(2) results from sample 2 and sample 3 (times 2 and 3) also confirmed that there was more variance between groups than within groups on the real team scale. However, the ICC(2) indices for sample 1 and sample 3

(time 1) were slightly below the recommended value of 0.50. For sample 1, this is likely to be because all of the business game teams were embedded in exactly the same context, performing the same team task, and therefore may not have varied indiscriminately with respect to the real team scale. Similarly for sample 3, at time 1, the project teams had only been working together for three weeks and were therefore very newly formed. In terms of Tuckman's model of group development (1965), the teams were still in the forming stage, and at this point were not yet fully engaged and focused on the execution of the team task. For this reason, at this early stage they were unlikely to vary on the dimensions of the real team scale to a great extent. However, as results from times 2 and 3 indicate this variation occurred as the teams progressed over time and began working more intensively on the team task, to the extent that sufficient discriminant validity was established. Regardless of these slightly low ICC(1) coefficients, researchers using ICC(1) to justify aggregation generally conclude that aggregation is justified when the  $F$  test for these values is significant, which was the case here (Klein & Kozlowski, 2000). The same analysis was carried out on the other team-level variables reported in this thesis in order to ensure that aggregation was empirically justified. This included a measure of team satisfaction (from samples 1 and 2) as well as various self-validation items for some of the real team sub-dimensions (also from samples 1 and 2). Results can be found in Appendix D.1 (see tables D.20 to D.23).

### **7.3 VALIDATION STUDY 3**

As discussed in chapter 5, the questionnaires used with samples 1 and 2 included a number of self-validation items to aid the researcher in establishing the convergent and concurrent validity of the new scale. Following data aggregation, team-level scores on the real team sub-dimensions were correlated with their respective self-validation items to ensure that the scale items were capturing what they are intended to measure. The following sections detail the findings from each dataset with regards to significant correlations between self-validation items and their respective real team sub-dimension. Where possible, self-validation items were combined to create reliable scales. Where this was not possible (either due to insufficient alpha coefficients or different types of response scale), self-validation items were treated independently.

### 7.3.1 Sample 1

Self-validation items relating to the sub-dimensions of reflexivity, interdependence and autonomy were included in the sample 1 questionnaire. For a list of items and their respective sub-dimension, see Appendix D.1 (table D.14). Hypotheses and results from each will now be discussed in turn.

#### 7.3.1.1 Reflexivity sub-dimension

Based on the four reflexivity self-validation items incorporated in the sample 1 questionnaire, four hypotheses were developed to test the convergent and concurrent validity of the sub-dimension of reflexivity. These hypotheses are based on theory and research evidence that was discussed in chapter 4. Each hypothesis and its theoretical underpinning will now be discussed in turn.

Reflexivity is a fundamental characteristic of real teams and is an overarching factor which can predict team effectiveness (West, 1996, 2004). As was discussed in chapter 4 (see section 4.4.3), in order to initiate reflexivity, teams must meet together on a regular basis, during which they exchange task-related information. Therefore, it was anticipated that the more often a team meets on a monthly basis, the more likely they are to have the opportunity to engage in team reflexivity. Hence, hypothesis 7.1 states that;

*Hypothesis 7.1:* Reflexivity will be positively related to the number of times a team meets in the average month.

Further, it can be argued that teams which perceive that they hold a sufficient number of regular team meetings in order to complete their tasks will do so because their regular meetings provide them with the opportunity to monitor, regulate and control their affect, cognition and behaviour, and thus engage in higher levels of team reflexivity. Hence, hypothesis 7.2 states that;

*Hypothesis 7.2:* Reflexivity will be positively related to the degree to which a team thinks that it holds meetings regularly enough in order to do the task well.

As team reflexivity is defined as the extent to which members of a team overtly and collectively reflect upon their immediate and long term objectives, processes and strategies and adapt them to current or anticipated circumstances (Carter & West, 1998; West, 1996,

2000, 2002), it can be argued that teams that engage in higher levels of reflexivity will report a greater amount of change in their team objectives over time. Hence, hypothesis 7.3 states that;

*Hypothesis 7.3:* Reflexivity will be positively related to the degree to which a team's main objectives have changed since the beginning of their task.

Finally, according to West's definition of reflexivity (1996, 2000, 2002), not only will reflexivity lead to changes in team objectives, but also to changes in the methods and processes used by a team to conduct its tasks. Hence, hypothesis 7.4 states that;

*Hypothesis 7.4:* Reflexivity will be positively related to the degree to which methods used by the team to carry out their tasks have changed.

For all of the four hypotheses relating to team reflexivity, it is recognised that wider demographic and contextual factors can affect the extent to which a team engages in reflexivity. For example, recent research has shown that group longevity and group diversity can both have an impact on team processes, including reflexivity (Schipper et al., 2003). Their study of 25 healthcare teams showed that older less diverse teams and younger more diverse teams engaged in higher levels of reflexivity than older more diverse teams and younger less diverse teams. It was theorised that reflexivity declines over time in highly diverse teams due to the erosion of team member problem solving capabilities and the attribution of conflict to relational and personal differences. In contrast, less diverse teams engage in more reflexivity over time because they will have developed problem-solving abilities, and attribute their conflicts to task-related, rather than relationship related factors (Schipper et al., 2003). Teams in sample 1 were all of the same age, and therefore group longevity was inherently controlled for. Although demographic information on diversity was not collected in the current study, it is acknowledged that such factors could have affected the findings, meaning that more diverse teams may have engaged in more reflexivity in order to more carefully self-regulate their task-related interactions, given their diverse composition.

Each of the four self-validation items relating to reflexivity used different response scales and the items were therefore treated independently for analysis.

**Results.** 53 teams from sample 1 generated sufficient team-level data to be analysed in study 3. The average score on the reflexivity sub-dimension (from the two reflexivity items in

the twelve-item real team scale) was positively correlated with the number of times that a team met in an average month ( $r = 0.32, p < 0.05$ ), as well as the degree to which a team thought that they held meetings regularly enough in order to do the task well ( $r = 0.69, p < 0.001$ ). Therefore, hypothesis 7.1 and 7.2 were accepted. However, it should be acknowledged that this does not necessarily mean that teams actually engaged in reflection during these team meetings. It should also be noted that the two self-validation items associated with hypotheses 7.1 and 7.2 yielded insufficient ICC(2) coefficients (see Appendix D.1), although the  $F$ -ratios were significant, therefore justifying aggregation.

More convincingly the reflexivity sub-dimension was negatively correlated with the extent to which the team's main objectives had not changed since the beginning of the business game module ( $r = -0.29, p < 0.05$ ), indicating that reflexivity was higher in teams who's main objectives had undergone the most change. Hypothesis 7.3 was therefore also accepted. However, again it should be noted that not all conditions for justifying aggregation of this self-validation item were met. See Appendix D.1 (table D.20) for indices of consensual and discriminant validity.

Regarding the fourth reflexivity self-validation item, no significant relationship was found between reflexivity and the extent to which methods used by the team to get the job done had changed since the beginning of the business game module, and therefore hypothesis 7.4 was rejected. However, this may have been due to the limited scope the business game teams had with regards to determining the methods of their task. Indeed, the practical ways by which the teams could actually carry out their task in sample 1 were very much determined by the technological capabilities of the business game software used, which was limited in terms of what it could do. Therefore, reflecting upon job methods was less relevant in the context of these teams, which may help to explain the insignificant relationship.

### ***7.3.1.2 Interdependence sub-dimension***

Based on the three interdependence self-validation items incorporated in the sample 1 questionnaire, four hypotheses were developed to test the convergent and concurrent validity of the interdependence sub-dimension. These hypotheses are based on theory and research evidence that was discussed in chapters 2 and 4 (see section 4.4.1). Each hypothesis and its theoretical underpinning will now be discussed in turn.

According to Shea and Guzzo (1987), task interdependence describes the degree of task-driven interaction among team members. Task interdependence is not only determined by the characteristics of the team task, but also the extent of discretion that team members exercise in establishing the level of interaction and cooperation required for effective performance (Shea & Guzzo, 1987). Hence, hypothesis 7.5 states that;

*Hypothesis 7.5:* Interdependence will be positively related to the amount of frequent interaction needed between team members to complete the task.

As is discussed in chapter 4, interdependence is evident when the successful completion of a task requires that team members share information, expertise and resources effectively, in order to meet their desired outcome (Cummings, 1978). The extent of task interdependence typically increases when tasks themselves become more difficult (Van de Vegt, et al., 2001). Therefore, in order to perceive itself as highly interdependent, and thus work in a cooperative and collaborative manner, a team must believe that it is comprised of the right number of people in order to achieve a particular task. Hence, hypothesis 7.6 states that;

*Hypothesis 7.6:* Interdependence will be positively related to the extent to which a team reports having the right number of people to do their task well.

Finally, when the level of task interdependence is low, the need for team members to interact with one another in order to attain their goals is also low. However, when task interdependence is high, a team's work must be arranged so that team members' co-ordinate their efforts, interact frequently and closely, and exchange resources in order to accomplish their task (Tesluk, Mathieu, Zaccaro, & Marks, 1997; Wageman, 1995, 1999). Hence, hypothesis 7.7 states that;

*Hypothesis 7.7:* Interdependence will be positively related to the amount of team members needed for close and regular interaction in order to complete the team's task.

For each of the three hypotheses outlined above, it should be acknowledged teams will only be in a position to work interdependently if they are assigned a task that requires teamwork (Hackman, 2002). If the structure and design of a task is more suitable for individuals, then under such conditions, the above hypotheses are unlikely to hold. However, as was discussed in chapter 5, teams in sample 1 were all working on the same business

simulation task which required input from all team members, based on the unique functional role assigned to each of them at the beginning of the course. Therefore, given that the team task was controlled for, task-related characteristics could not have accounted for variance in the results across teams.

Again, the interdependence self-validation items used in the sample 1 questionnaire used different response scales and were therefore treated independently for analysis.

**Results.** The relationship between interdependence and the frequency with which team members reported having to work with other members of their team in order to complete the team's task was non-significant, although in the expected direction. Therefore, hypothesis 7.5 was rejected. However, there was a significant correlation between interdependence and the extent to which a team felt that they had the right number of people to do their task well ( $r = 0.340, p < 0.05$ ). There was also a significant relationship between interdependence and the number of team members that a respondent reported having to work regularly and closely with in order to complete the team's task ( $r = 0.42, p < 0.005$ ). Hypotheses 7.6 and 7.7 could therefore be accepted. However, it should be again noted that not all of the conditions for the aggregation of these self-validation items were met (see Appendix D.1, table D.20).

### **7.3.1.3 Autonomy sub-dimension**

Based on the three autonomy self-validation items incorporated in the sample 1 questionnaire, one hypothesis was developed to test the convergent and concurrent validity of the sub-dimension of autonomy. As is discussed in chapter 4 (see section 4.4.4), team autonomy is concerned with the extent to which a team has discretion, independence and substantial freedom to determine procedures and schedule work (Cordery, Mueller, & Smith, 1991; Hackman, 1987, 2002; Kirkman & Rosen, 1999; Langfred, 2000; Van Mierlo, Rutte, Vermunt, Kompier & Doorewaard, 2007). Low levels of autonomy mean that a task is predominantly structured and regulated by people outside of the team. Conversely, when team autonomy is high, there is a much greater need to team members to engage in collective decision making about their own objectives, tasks and processes (Rico, Molleman, Sanchez-Manzanares & Van der Vegt, 2007). This is particularly important when teams are engaged in complex and time critical tasks, during which they need to make informed decisions quickly. Hence, hypothesis 7.8 states that;

*Hypothesis 7.8:* Autonomy will be negatively related to the extent to which people outside of the team set team objectives, decide who will do what in the team and decide how the team should carry out its tasks.

The three self-validation items related to autonomy all used the same response scale and were combined to form a reliable three item scale ( $\alpha = .70$ ). The items tapped into how often people outside of the team set team objectives, decided who would do what in the team, and decided how the team would carry out its tasks. However, when aggregated to the team-level of analysis all three of the items yielded inadequate results with regards to consensual and discriminant validity (see Appendix D.1, table D.20). Correlational analysis was therefore carried out with caution.

**Results.** No significant relationship was found between the autonomy sub-dimension and the autonomy self-validation scale, and therefore hypothesis 7.8 was rejected. Again, this is possibly related to the context of the business game, in which much of what the teams were able to do was largely prescribed by the business game course requirements. In this context, the teams were not able to exercise the same level of control and discretion over their task as they perhaps could in a real organisational context. An alternative explanation could be drawn from the validity of the autonomy self-validation items themselves, which may not have tapped into the same meaning of autonomy which is captured in the real team scale. This possibility however was subsequently disconfirmed with results from sample 2 (see section 7.3.2.3).

### **7.3.2 Sample 2**

Self-validation items relating to the sub-dimensions of reflexivity, interdependence and autonomy were also included in the sample 2 questionnaire, although some of the items were re-worded or changed in order to more accurately capture the real team dimensions. These newly written items were examined by two subject-matter experts for face validity, to ensure that they accurately captured the respective real team sub-dimension. See Appendix D.1 (table D.22) for a full list of the items, including indices of consensual and discriminant validity. 63 teams from sample 2 generated sufficient team-level data to be analysed. Results from each sub-dimension will now be discussed in turn.

### **7.3.2.1 Reflexivity sub-dimension**

Based on the three reflexivity self-validation items incorporated in the sample 2 questionnaire, three hypotheses were developed to test the convergent and concurrent validity of the sub-dimension of reflexivity. Each will be briefly discussed in turn with regards to its theoretical underpinning.

Reflexivity has been proposed as the higher level equivalent to reflective thinking and meta-cognition at the individual level (Ericsson & Lehmann, 1996; Schön, 1983). The processes of reflecting on objectives and monitoring of progress and strategies facilitates adaptation and characterise the concept of reflexivity (Gurtner, Tschan, Semmer & Nägele, 2007; West 1996). Teams which engage in high levels of reflexivity should therefore have a greater awareness about their recent performance and current progress towards team objectives. Thus, hypothesis 7.9 states that;

*Hypothesis 7.9:* Reflexivity will be positively related to the extent to which a team discussed whether it was meeting its objectives during the past six months.

Hypotheses 7.10 and 7.11 were based on exactly the same theoretical reasoning as hypotheses 7.3 and 7.4 earlier in this study (see section 7.3.1.1), and stated that;

*Hypothesis 7.10:* Reflexivity will be positively related to the extent to which methods used by the team to get the job had changed during the past six months.

*Hypothesis 7.11:* Reflexivity will be positively related to the degree to which a team's main objectives had changed since the beginning of their task

Although each of the three self-validation items used the same response scale, the alpha reliability coefficient indicated that they could not be combined to create a reliable scale. Each item was therefore treated independently for analysis.

**Results.** Reflexivity was positively related to the extent to which a team discussed whether it was meeting its objectives during the past six months ( $r = 0.69, p < 0.001$ ), as well as the extent to which methods used by the team to get the job had changed during the past six months ( $r = 0.36, p < 0.005$ ). Therefore hypotheses 7.9 and 7.10 could be accepted. However, hypothesis 7.11 was rejected as reflexivity was not positively related to the extent to which the team's main objectives had changed during the past six months. It is arguable that this

insignificant relationship is due to the six month time frame specified in this item. Indeed, overarching team objectives may remain stable and unchanged for longer periods of time, with topics of reflexivity being more typically related to processes and strategies by which these objectives are met. Therefore, in hindsight, a longer time frame should have been specified in this particular self-validation item.

### **7.3.2.2 Interdependence sub-dimension**

Based on the two self-validation items incorporated in the sample 2 questionnaire, one hypothesis was developed to test the convergent and concurrent validity of the sub-dimension of interdependence. Again, this hypothesis was based on the same theoretical reasoning as hypothesis 7.7 earlier in this study (see section 7.3.1.2) and states that;

*Hypothesis 7.12:* Interdependence will be positively related to the degree to which team members have to work closely together in order for the team to meet its goals and responsibilities.

When combined, the two self-validation items related to interdependence formed a reliable scale ( $\alpha = 0.87$ ). However, it is acknowledged that two item measures can lead to inflated alpha coefficients (Kopalle & Lehmann, 1997). Therefore, the intercorrelation between the two items was requested. Results indicated that the items were strongly correlated ( $r = .78$ ,  $p < 0.01$ ), suggesting that they are tapping into the same underlying construct of interdependence.

**Results.** Interdependence was positively related to how frequently members of a team had to work together in order for the team to meet its goals and responsibilities ( $r = 0.56$ ,  $p < 0.001$ ), thus providing evidence for the concurrent and convergent validity of the real team scale. Hypothesis 7.12 was therefore accepted.

### **7.3.2.3 Autonomy sub-dimension**

Based on the three self-validation items incorporated in the sample 2 questionnaire, one hypothesis was developed to test the convergent and concurrent validity of the sub-dimension of autonomy. This hypothesis was based on exactly the same theoretical reasoning as hypothesis 7.8 earlier in this study (see section 7.3.1.3) and states that;

*Hypothesis 7.13:* Autonomy will be negatively related to the extent to which people outside of the team set team objectives, decide who will do what in the team and decide how the team should carry out its tasks.

When combined, the three self-validation items relating to autonomy formed a reliable scale ( $\alpha = 0.79$ ). This scale was the same as that used in the sample 1 questionnaire and tapped into how often people outside of the team set team objectives, decided who would do what in the team, and decided how the team would carry out its tasks.

**Results.** After the scores were reverse coded, results showed that there was a significant positive correlation with a teams average score on this self-validation scale and their score on the autonomy sub-dimension ( $r = 0.33, p < 0.005$ ). This suggests that teams which report higher levels of autonomy on the real team scale also report that people outside of their team *rarely* set their team objectives, decide who does what in the team, and decide how the team should carry out its task. Thus, hypothesis 7.13 could be accepted.

### **7.3.3 Discussion**

Overall, results from the self-validation data incorporated into the sample 1 and 2 questionnaires suggest that there is consistent empirical support for the concurrent and convergent validity of the real-team sub-dimensions of reflexivity, interdependence and moderate support for the autonomy sub-dimension. Indeed, significant relationships for all three of the sub-dimensions was found from the organisational dataset set (sample 2), which arguably has more leverage than a student sample. However, there are a number of methodological limitations regarding validation study 3 that should be acknowledged.

Firstly, given that the self-validation items were self-report measures, and were therefore from the same data source as the sub-dimension scores on the real team scale, common method variance may have occurred, given the propensity of the subject to answer in a similar way to multiple items. Secondly, the self-validation items themselves were not substantially validated, other than for their face validity by two subject matter experts. Therefore, it is possible that these items did not sufficiently capture the real team dimensions. However, further validation of these items was not within the remit or scope of this thesis. Finally, with regards to results from sample 1 in particular, a cautionary note should be made in relation to the justification of aggregating the self-validation items to the team-level. As is clear from the tables in Appendix D.1, many of the items did not meet all of the criteria

required for data aggregation discussed in section 7.1. The literature identifies a number of potential reasons why indices of discriminant validity at the team-level may yield inconsistent or low results. First, even though the ICC(1) controls for team size (Klein & Kozlowski, 2000), the *F*-test for ICC(1) indices and the ICC(2) values are influenced by both number and size of the units in a sample. Therefore, the small sample size of sample 1 ( $N = 53$ ) may have weakened the results. Secondly, range restrictions due to sample size artefacts can artificially reduce between group variance (George & James, 1993). As was discussed earlier, these teams were all embedded within the same context, doing the same task. They all followed identical course guidelines for the business game simulation and were all of a very similar size, demographic and structure. Therefore, teams did not vary indiscriminately with respect to the all of the self-validation items.

#### **7.4 VALIDATION STUDY 4**

Verbal communication is a natural by-product of teamwork, and provides a rich data source for understanding the underlying cognitive processes and interactions in a team. A reasonably accurate judgment about a team performance can be made by simply listening to teams whilst they perform a task (Foltz & Martin, 2009). Transcripts of team meetings can also provide an insight into various categories of teamwork behaviours. Indeed, a number of studies have demonstrated that team performance can be predicted through the hand coded analysis of team communication (cf. Harris & Sherblom, 2008). The approach rests on the premise that analysing communication data is a means of assessing team cognition, which manifest's itself in natural conversation and interactions between team members. The aim of validation study 4 was to provide further validation for the new real team scale. Using expert ratings of 21 team meeting transcripts from sample 1, both the convergent and concurrent validity of the new scale could be further assessed.

As was already discussed in chapter 5, external convergent validity is a form of construct validity which involves the measurement of the same construct, in this case team realness, in different ways. High correlations between measures of theoretically related constructs are indicative of external convergent validity. For the purposes of this study, the researcher aimed to compare experts' ratings of team realness, as exhibited in behavioural observations of team meeting transcripts, with each team's actual self-rating of team realness from the sample 1 questionnaire. If these measures significantly correlate with one another, external convergent validity for the new measure can confidently be established. Given that

the behavioural observation data was collected from expert raters, and not from the same respondents who completed the questionnaires, the problem of same-source common method variance was avoided, meaning that the correlations reported later in this study are not inflated. The expert raters' scores also provided rich data for determining the concurrent validity of the real team dimensions, given that the team meetings were all recorded at the same time that the team's completed the questionnaire. Given that specific nature of this data collection procedure, details about the methodology for validation study 4 were not outlined in chapter 5, and will instead be discussed in detail here.

#### **7.4.1 Methodology**

The methodology broadly followed that which is used for developing behavioural observation scales (BOS). The BOS method is similar to that of behaviourally anchored rating scales (BARS), in that it involves the use of observers to provide subjective ratings on specific aspects of team performance. However, according to Kendall and Salas (2004) the BOS method is superior over other interaction analysis methods such as the BARS approach, as it supports the evaluation of typical, as opposed to isolated performance. In developing behavioural items, the researcher firstly conceptually defines the behaviour of interest using a theory driven approach, before identifying specific examples of each type of behaviour. This is typically carried out using the critical incident technique (CIT), whereby the researcher generates detailed behavioural episodes exemplifying typically high and low performance. These examples are condensed in order to generate specific behavioural statements. Following guidelines for the CIT, the behavioural statements generated for this study were made specific to the context of the sample 1 business game simulation, incorporating context specific terminology relevant to the teams' task.

According to BOS methodology, behavioural examples of each of the real team dimensions needed to firstly be developed. Following definition of a real team presented in chapter 4, the team is the unit of analysis, and therefore one needs to measure the extent to which behaviours are exhibited by the team as a whole, rather than individual team members. In line with the initial development of possible scale items, a deductive procedure was followed, whereby the list of dimensions which define a concept were firstly identified and agreed upon by a group of experts. This stage was already complete as the real team dimensions are already theoretically established (see chapter 4). In line with the BOS methodology, the researcher then generated a number of 'high' and 'low' behavioural statements for each of the real team dimensions. Two colleagues who were experts in the area

of team research then reviewed the items to ensure that the statements accurately reflected each of the real team sub-dimensions. Any behavioural statements which appeared ambiguous (i.e. there was disagreement between the researcher and/or the experts) were either discarded or amended, and the final set of behavioural observations was re-reviewed by a separate expert colleague. The final list of items were formatted into six separate behavioural observation sheets; one for each real team sub-dimension (see Appendix D.2). In order to capture the full continuum of a sub-dimension in action, a number of both 'high' and 'low' behavioural statements were included. Raters' were required to rate each statement according to its frequency of occurrence in a team meeting transcript, using a five point likert scale (1 = *almost never*, 5 = *almost always*).

#### ***7.4.1.1 Data collection***

Team meeting recordings were carried out at the same time that questionnaires were distributed to sample 1. Over a three week period, the researcher recruited teams within the business game module who agreed to have their next team meetings recorded for research purposes. The researcher gave a short presentation to each business game tutorial group, outlining the key purpose of the research and what was involved in participation. The researcher explained that anonymity and confidentiality would be maintained throughout the research process, and at no point would individuals or teams be identifiable. The researcher then spoke to each team individually and asked if they would be willing to have their next team meeting recorded. Teams which agreed to participate provided the researcher with details of their next meeting, including the date, time and place. The researcher then met each team at their specified meeting location. At this stage the teams were re-briefed about the purposes of the exercise and each participating team member was asked to sign a consent form (see Appendix D.3). The researcher was not present during the team meetings, and simply left each team with the recording equipment. Once a meeting was finished, the participating team returned the recording equipment to the researcher and were thanked for their participation.

Twenty six team meetings were recorded in total. However, following Dawson's selection ratio (2003), only 21 of the teams provided sufficient team-level data in the questionnaire to justify data aggregation, and thus generate team-level scores. It can therefore be argued that the team meeting content provided an accurate reflection of typical interaction for each team. These 21 tape recordings were transcribed by the researcher. One hundred and ninety five pages of transcript were produced in total, with the average team meeting

providing 9 pages of transcript. Of the 21 meetings, in nine of them all team members were present, in ten meetings only one team member was missing, and in the remaining two team meetings, two team members were missing.

#### ***7.4.1.2 Rating procedure***

Six experts rated the team meeting transcripts (one male and five females). One was the researcher herself, and the other five all held postgraduate qualifications in the field of Organisational Psychology. None of the expert raters had any prior involvement or understanding of the theoretical model or empirical research presented in this thesis, and therefore provided uninformed and value-free assessments of the team meeting transcripts. Further, the researcher carried out her own 'blind' ratings of the transcripts, and therefore could not make any associations between the team meeting transcripts and the questionnaire data relating to each team. To further reduce researcher bias, the team ID numbers from the questionnaire data were re-coded into a different format for the purposes of labelling each transcript.

The six expert raters worked in pairs, with each pair working on two of the real team sub-dimensions. By only assigning each expert rater with two sub-dimensions, the researcher aimed to reduce the halo effect which may have occurred if they were required to rate multiple transcripts on multiple sub-dimensions. Further, using two raters to assess each dimension also allowed the researcher to establish inter-rater reliability (IRR), ensuring that there was a high degree of consistency between the raters' scores on a given sub-dimension (see section 7.4.1.3).

Each pair of expert raters was invited to an initial two hour training session to discuss to overall aims and objectives of the exercise. A key aim of the training session was to minimize common rating errors such as central tendency, the halo effect, positive and negative leniency, first impressions and primacy-recency effects (Latham, Wexley & Pursell, 1975). The raters were firstly informed about the context within which the teams had been working and were given a brief introduction to the business game module. Specific terminology which commonly appeared in the team meeting transcripts was also discussed. This information was summarised on an instruction sheet for the raters to refer to at any point during the coding process (see Appendix D.4). The raters were then trained on their two respective real team sub-dimensions. Taking each sub-dimension in turn, the researcher introduced the concept and provided a written definition. Raters were encouraged to discuss

their own interpretations of the concept within one another, to ensure that they had a similar understanding about its meaning. The researcher then read through each behavioural item in turn, to check that they were clearly understood by each rater. The raters were then asked to examine some extracts of transcript where the respective sub-dimension was evident. This short introductory exercise not only provided raters with some behavioural examples of the sub-dimension in action, but also gave an initial indication of IRR. If the raters did not provide consistent ratings, they were encouraged to discuss their interpretations until they felt that they had reached a shared understanding of the concept and what it looked like in terms of observable behaviours in the transcripts.

At this stage, raters went away to work independently on four initial transcripts. They were instructed to read through each transcript with one real team sub-dimension in mind. According to Kendall and Salas (2004), researchers using the BOS method should ensure that observers are aware of the primacy-recency effect, whereby they are more likely to recall and evaluate behaviour that they observed most recently or initially at the beginning of the transcript. Therefore, the raters were encouraged to code chunks of the transcript at a time using a highlighter pen, and then consider an overall score at the end for each behavioural observation item. They were also encouraged to note comments or questions on the rating sheet which could be discussed in the subsequent training session.

#### ***7.4.1.3 Inter-rater reliability***

The four transcripts which were initially rated comprised 20% of the total number of transcript pages. At this stage, each set of rating scores was checked for IRR to ensure that there was a high degree of consistency between each pair of raters on each real team sub-dimension. IRR estimations refer to the equivalence of relevant ranking rather than the equivalence of the actual scores (LeBreton & Senter, 2008). Conversely, inter-rater agreement (IRA) is concerned with the absolute consensus of scores between multiple judges on a number of targets, meaning that these scores are interchangeable in terms of their absolute value (Bliese, 2000; James, Demaree, & Wolf, 1993). Both IRR and IRA are concerned with whether ratings of one judge are ‘similar’ to ratings of other judges (LeBreton et al., 2003), but just define interrater similarity differently. In this study, the IRR approach is used to look at the rank order similarity or relative consistency between each pair of raters.

Intra-class correlations (ICCs) provide a useful tool to examine the degree of homogeneity of scores between raters who have subjectively rated the same target or

phenomenon. A low coefficient may indicate that the raters were poorly trained, or that the scales they use are not well defined or clear. Shrout and Fleiss (1979) proposed six types of ICCs which can be employed to establish IRR. For the current study, SPSS was used to calculate univariate ANOVAs, with ‘team’ and ‘rater’ treated as fixed effects. The appropriate mean square values were used to calculate an ICC (3, *k*) value for each real team sub-dimension. ICC (3, *k*) assesses the reliability of mean scores from the fixed sample of two judges using the following formula;

$$ICC(3, k) = \frac{BMS - EMS}{BMS}$$

The initial ICC values for each rating pair on each dimension are provided in the table 7.2 under the ‘time 1’ column. According to Bliese (2000), ICC(2) values of above 0.70 are considered to demonstrate acceptable levels of IRR. If an initial ICC value for a given dimension was below 0.70, differences in ratings between each rater pair were closely explored in a second training session. If, for a given item, a rater pair disagreed by more than one scale-score point, the item was discussed in relation to the specific transcript at hand. Using the areas of transcript highlighted during analysis, each rater was asked to describe why they had assigned a particular rating, and discuss their different interpretations of the item itself, and/or the specific behavioural example evident in the transcript. Therefore, inconsistencies between raters were resolved through discourse (cf. De Dreu & Weingart, 2003). This second training session typically lasted between one and two hours, and required that the raters come to a consensus on each of the problematic items. Consistency was considered to be established when there was no more than a one scale-score point difference on each item. At the end of the session, the researcher summarised the key areas that had been discussed, so that the raters understood how to proceed in analysing the remaining transcripts to ensure that they would be using the same analytical approach. Table 7.2 shows the ‘time 2’ ICC values based upon the newly agreed set of rater scores. Given the high level of IRR upon all sub-dimensions, the raters were subsequently instructed to proceed to work independently on the remaining transcripts.

**Table 7.2: ICC values at time 1 and time 2**

Real Team Dimension	Single Measures ICC value	
	Time 1	Time 2
Shared objectives (pair 1)	0.79	<i>n/a</i>
Reflexivity (pair 2)	0.78	<i>n/a</i>
Interdependence (pair 3)	0.31	0.95
Autonomy (pair 3)	0.45	0.85
Boundedness (pair 2)	0.63	0.93
Specified roles (pair 1)	0.96	<i>n/a</i>

## 7.4.2 Results

### 7.4.2.1 Shared objectives sub-dimension

Twelve behavioural observation items were developed in order to capture the objectives sub-dimension (see Appendix D.2 for full list of items). Four items aimed to capture objective clarity, another four aimed to capture agreement to team objectives, and the final four were designed to capture commitment to team objectives. Within each of these three categories, two items were positively worded and two items were negatively worded.

The aspects of hypotheses 7.14 and 7.15 capturing the clarity of objectives relate to items 1 to 4 (see table 7.3). The specific hypotheses relating to these items were based on theoretical deduction that teams which have clearer team objectives should, as a result, exhibit a number of associated behaviours during their team meeting. These behaviours included demonstrating a clear understanding of what it needs to achieve in the next business game practical session and/or group report (item 1) and appearing confident about the tasks that they needed to complete in order to meet their goals (item 2). This is because clear objectives specify the level of performance that team members are expected to achieve (Weldon & Weingart, 1993). However, when the clarity of objectives is low, team members are more likely to interpret information and events differently, which can lead to confusion and disorganised responses (Kozlowski et al., 1999). Therefore it was also hypothesised that the shared objectives sub-dimension will be negatively related to the extent to which decisions are left ‘up in the air’ (item 3) and the extent to which a team appears unclear about what it wants to achieve in the remainder of the business game module, with team members expressing signs of confusion and/or bewilderment about their task(s) (item 4).

The aspects of hypotheses 7.14 and 7.15 capturing the agreement on team objectives relate to items 5 to 8. The specific hypotheses relating to these items were based on

theoretical deduction that teams which report that they agree upon team objectives will also communicate a consensus over team objectives during a team meeting, with team members backing-up each others suggestions (item 5), and signalling confirmation and agreement (item 6). Indeed, Weldon and Weingart (1993) argue that communication and cooperation mediate the effect of team objectives, both of which would be present if the behaviours described above are observed. In turn, if there are low levels of reported agreement over team objectives, it was hypothesised that the shared objectives sub-dimension would be negatively related to the amount of disagreement expressed between team members (item 7) and the extent to which a team fails to reach consensus at the end of the team meeting over what needs to be achieved in the future (item 8).

Finally, the aspects of hypotheses 7.14 and 7.15 capturing commitment to team objectives relate to items 9 to 12. Goal commitment refers to one's determination to reach a goal (Klein et al., 1999), with Locke et al. (1988) arguing that goal setting will not work without commitment to goals. At the team-level this means that a team will be committed to achieving their shared team objectives. It was therefore hypothesised that teams which report more highly on the shared objectives sub-dimension will demonstrate more commitment, participation and willingness to contribute towards team goals during a team meeting (items 9 and 10). Conversely, it was hypothesised that the shared objectives sub-dimension would be negatively related to the degree to which a team does not appear to care whether they meet their goals (item 11), and engage in discussion which is not relevant to their team task during team meetings (item 12).

Based on the theoretical reasoning above, the following two hypotheses were developed for testing (corresponding items can be found in table 7.3);

*Hypothesis 7.14:* Scores on the shared objectives sub-dimension will be positively related to behavioural observation items 1, 2, 5, 6, 9 and 10.

*Hypothesis 7.15:* Scores on the shared objectives sub-dimension will be negatively related to behavioural observation items 3, 4, 7, 8, 11 and 12.

**Results.** Support for the concurrent and convergent validity of the shared objectives sub-dimension was provided by a significant correlation with expert ratings on the following behavioural observations (see table 7.3):

- *Item 1.* This team demonstrates a clear understanding of what it needs to achieve in the next business game practical session and/or group report ( $r = 0.51, p < 0.05$ ).
- *Item 6.* This team backs-up team member suggestions regarding what the team's objectives should be, signalling confirmation and agreement ( $r = 0.44, p < 0.05$ ).

Hypothesis 7.14 can therefore be partially accepted, given that there were also positive correlations between the objectives sub-dimension and the other positively worded behavioural observation items (although these were not significant). However, there were no significant correlations to support hypothesis 7.15, and therefore this hypothesis was rejected.

**Table 7.3: Concurrent validity of shared objectives sub-dimension**

<b>Behavioural Observation Items</b>	<b>Mean</b>	<b>S.D.</b>	<b>Objectives</b>	<b>Real teamness</b>
1. This team demonstrates a clear understanding of what it needs to achieve in the next business game practical session and/or group report.	4.81	.40	.51* 21	.35 21
2. This team appears confident about the sorts of tasks it needs to carry out in order to meet team objectives, discussing a time frame for completing the work.	4.62	.67	.31 21	.15 21
3. This team recognises the need to set goals for the next business game practical session and/or group report, but decisions are left 'up in the air'	1.29	.56	-.24 21	-.01 21
4. This team appears unclear about what it wants to achieve in the remainder of the business game module, with team members expressing signs of confusion and/or bewilderment about their task(s).	1.19	.51	-.21 21	.05 21
5. This team demonstrate clear consensus over team goals and objectives, with team members seeking confirmation about what the team has decided to aim for in the business game practical session and/or group report.	4.71	.56	.32 21	.12 21
6. This team backs-up team member suggestions regarding what the team's objectives should be, signalling confirmation and agreement.	4.71	.56	.44* 21	.24 21
7. This team shows disagreement amongst team member's opinions and suggestions about team goals.	1.29	.64	-.06 21	-.02 21
8. This team fails to reach consensus at the end of the team meeting over what needs to be achieved in the future.	1.14	.36	-.35 21	-.06 21
9. This team appears to be committed to achieving the team's objectives for the business game module.	4.76	.54	.35 21	.18 21
10. This team fully participates in discussing how the team objectives can be achieved in the practical session(s) and/or group report, with all team members offering suggestions on how they can contribute to task completion.	4.67	.66	.40 21	.14 21

11. This team does not appear to care about whether it will meet its goals for the business game simulation and/or group report.	1.10	.44	.09 21	.21 21
12. This team engages in discussion that has no relevance to what needs to be achieved in business game simulations and/or the group report.	1.29	.56	-.10 21	.05 21

$N=21$  teams †  $*p < 0.05$ ;  $**p < 0.01$ ;  $***p < 0.001$ .

#### 7.4.2.2 Reflexivity sub-dimension

Six behavioural observation items were developed in order to capture the reflexivity sub-dimension, three of which were positively worded and three of which were negatively worded.

As was discussed at length in chapter 4 (see section 4.4.3), reflexivity allows one to identify discrepancies between where one is currently performing and where one should be, and is defined by the extent to which members of a team overtly and collectively reflect upon their immediate and long term objectives, processes and strategies and adapt them to current or anticipated circumstances (Carter & West, 1998; West, 1996, 2000, 2002). It was therefore hypothesised that teams which report higher levels of reflexivity will exhibit a number of specific observable behaviours during their team meetings, including spending time talking about what happened in their last task episode and comparing it to other teams (item 1), discussing ways in which they could have done things differently and adapting their plans for the future (item 2), and adjusting performance goals in light of new circumstances (item 3). All of these behaviours demonstrate team reflexivity in action. In turn, the reflexivity sub-dimension was expected to be negatively associated with the extent to which teams do not spend time recalling and discussing performance (item 4), relevant events or information (item 5), or the degree to which no suggestions are made about how to improve team processes and effectiveness (item 6). The following hypotheses were therefore developed for testing (corresponding items can be found in table 7.4);

*Hypothesis 7.16:* Scores on the reflexivity sub-dimension will be positively related to behavioural observation items 1, 2, and 3.

*Hypothesis 7.17:* Scores on the reflexivity sub-dimension will be negatively related to behavioural observation items 4, 5 and 6.

**Results.** Support for the concurrent and convergent validity of the reflexivity sub-dimension was provided by a significant correlation with expert ratings on the following behavioural observations (see table 7.4):

- *Item 2.* After some reflection on previous performance (*either in the business game simulation or in coursework assignments*), the team talks about ways in which they might have done things differently, and how they plan to improve their performance in the future. ( $r = 0.44, p < 0.05$ ).
- *Item 3.* This team re-assesses and adjusts its performance goals in light of new circumstances (*for example; the provision of new information on the coursework assignment, or a change in position of the winning teams in the business game simulation*). ( $r = 0.46, p < 0.05$ ). Overall scores on the real team scale were also significantly correlated with this behavioural observation ( $r = 0.51, p < 0.05$ ).

Hypothesis 7.16 can therefore be partially accepted, given that there were also positive correlations between the reflexivity sub-dimension and the other positively worded behavioural observation items (although the correlation with item 1 was not significant). There were no significant correlations to support hypothesis 7.17, and therefore this hypothesis was rejected. However, the correlation coefficients were in the expected negative direction.

**Table 7.4: Concurrent validity of reflexivity sub-dimension**

Behavioural Observation Items	Mean	S.D.	Reflexivity	Real teamness
1. This team spends time talking about what happened in previous practical session(s) and/or their business plan, reflecting on their performance and comparing it to other business game teams	3.76	1.26	.26 21	.23 21
2. After some reflection on previous performance (either in the business game simulation or in coursework assignments), the team talks about ways in which it might have done things differently, and how it plans to improve performance in future	3.33	1.43	.44* 21	.36 21
3. This team re-assesses and adjusts its performance goals in light of new circumstances ( <i>for example; the provision of new information on the coursework assignment, or a change in position of winning teams in the business game simulation</i> ).	3.29	1.38	.46* 21	.51* 21

4. This team does not spend any time recalling and discussing their performance on business game coursework	3.76	1.45	-0.09 21	-.26 21
5. This team does not spend any time recalling and discussing previous events in practical sessions, or information provided in tutorial sessions	2.38	1.16	-.39 21	-.39 21
6. This team makes no suggestions on how they might improve their team processes and/or effectiveness for the remainder of the module	3.05	1.07	-.42 21	-.35 21

$N=21$  teams † \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

#### **7.4.2.3 Boundedness sub-dimension**

Four behavioural observation items were developed in order to capture the boundedness sub-dimension, three of which were positively worded and one of which were negatively worded.

As was outlined previously in chapter 4, ‘*basic to the definition of a work team is the identity of the individuals treated as members by both group and organisation*’ (Sundstrom et al., 1990; p.126). According to Hackman (2002), in order to work together team members must clearly understand who is in the team, meaning that real teams are bounded within their organisational environment. It was therefore hypothesised that scores on the boundedness sub-dimension would be positively correlated with a number of behavioural observations, including the extent to which a team exhibits a strong team identity (item 1), the frequency with which a team uses its company name to describe itself (item 2), and the extent to which the team appears clear about team membership (item 3). In turn, it was expected that the boundedness sub-dimension would negatively correlate with the extent to which a team appears confused about who belongs to the team, and who does not (item 4). The following hypotheses were therefore developed for testing (corresponding items can be found in table 7.5);

*Hypothesis 7.18:* Scores on the boundedness sub-dimension will be positively related to behavioural observation items 1, 2, and 3.

*Hypothesis 7.19:* Scores on the boundedness sub-dimension will be negatively related to behavioural observation item 4.

**Results.** Support for the concurrent and convergent validity of the boundedness sub-dimension was provided by a significant correlation with expert ratings on the following behavioural observation (see table 7.5):

- *Item 1.* This team appears to have a strong team identify (*for example, the team frequently uses terms like ‘we’ when referring to the team, and ‘us and them’ when talking about other business game teams*) ( $r = 0.44, p < 0.05$ ). Overall scores on the real team scale were also significantly correlated with this behavioural observation ( $r = 0.49, p < 0.05$ ).

**Table 7.5: Concurrent validity of boundedness sub-dimension**

Behavioural Observation Items	Mean	S.D.	Boundedness	Real teamness
1. This team appears to have a strong team identify ( <i>for example, the team frequently uses terms like ‘we’ when referring to the team, and ‘us and them’ when talking about other business game teams</i> )	3.71	1.15	.44* 21	.49* 21
2. This team frequently uses their company name to describe themselves	1.43	.81	.41 21	.34 21
3. This team has a clear idea about who belongs on the team – even if some members are absent from the meeting	4.95	.22	.40 21	.16 21
4. This team shows confusion about team membership; whereby members are not clear about who belongs to the team, and who does not	1.10	.30	-.01 21	-.22 21

$N=21$  teams † \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

Hypothesis 7.18 can therefore be partially accepted, given that there were also positive correlations between the boundedness sub-dimension and the other positively worded behavioural observation items (although the correlation with items 2 and 3 was not significant). However, hypothesis 7.19 could not be supported.

#### **7.4.2.4 Specified roles sub-dimension**

Four behavioural observation items were developed in order to capture the specified roles sub-dimension, two of which were positively worded and two of which were negatively worded.

A role is defined as a pattern of behaviours perceived by an individual as behaviours that are expected by their organisation (Ilgen & Hollenbeck, 1991; Naylor, Pritchard, & Ilgen, 1980), and is considered as a key conceptual unit of the team (Ilgen et al., 2005) given that actions in teams are carried out through role behaviours (Katz & Kahn, 1978). As it is argued that real teams have specified roles for team members (section chapter 4, section 4.4.6), it was subsequently hypothesised that the specified roles sub-dimension will be positively related to the extent to which a team is clear about who does what role in the team (item 1), with the team directing specific questions and suggestions towards team members who appear to occupy a specific role within the team (item 2). Further, it was expected that the specified roles sub-dimension would be negatively related to members appearing unclear about who occupies each director role (item 3), and struggles to identify team members to step forward to accept role responsibility for a particular task or outcome (item 4). The following hypotheses were therefore developed for testing;

*Hypothesis 7.20:* Scores on the specified roles sub-dimension will be positively related to behavioural observation items 1 and 2.

*Hypothesis 7.21:* Scores on the specified roles sub-dimension will be negatively related to behavioural observation items 3 and 4.

**Results.** There were no significant relationships between the behavioural observations for the specified roles sub-dimension, and the team scores on the real team scale. Therefore, hypotheses 7.20 and 7.21 were both rejected.

#### **7.4.2.5 Interdependence sub-dimension**

Six behavioural observation items were developed in order to capture the interdependence sub-dimension, three of which were positively worded and three of which were negatively worded.

As has already been discussed at various points within this thesis (see chapter 4, section 4.4.1 for a detailed discussion), interdependence defines the extent to which members of a team must work interactively and cooperatively in order to successfully complete a task (Stewart & Barrick, 2000). It was therefore hypothesised that scores on the interdependence sub-dimension would correlate with a number of specific observable behaviours which occur during a team meeting. Firstly it was expected that the interdependence sub-dimension would

be positively correlated with the degree to which a team depends on particular team members for the completion of particular team tasks (item 1), suggesting that team members are dependent on one another for skills, knowledge and the completion of sub-tasks. Based on the same theoretical reasoning, it was also expected that the interdependence sub-dimension would positively correlate with the extent to which a team discusses the specific tasks that need to be fulfilled by absent team members (item 2), as well as the demonstration of effective coordination which allows the team to successfully combine their knowledge, skills and resources in preparation for the next practical sessions (item 3). Conversely, the interdependence sub-dimension was expected to negatively correlate with extent to which a team is more orientated towards the individual assignment, rather than the group task (item 4), did not seek help, assistance or information from specific team members about the teams task (item 5), and the extent to which a team was comprised of individuals who appeared to pursue their own work, demonstrating no interest in the work progress of their teammates (item 6). The following hypotheses were therefore developed for testing;

*Hypothesis 7.22:* Scores on the interdependence sub-dimension will be positively related to behavioural observation items 1, 2 and 3.

*Hypothesis 7.23:* Scores on the interdependence sub-dimension will be negatively related to behavioural observation items 4, 5 and 6.

**Results.** There were no significant relationships between the behavioural observations for the interdependence sub-dimension, and the team scores on the real team scale. Therefore, both hypotheses 7.22 and 7.23 were rejected.

#### **7.4.2.6 Autonomy sub-dimension**

Six behavioural observation items were developed in order to capture the autonomy sub-dimension, three of which were positively worded and three of which were negatively worded.

This final set of hypotheses was again based on the theoretical deduction from chapter 4 (see section 4.4.4). According to Langfred (2000) group autonomy is defined as ‘*the amount of control and discretion the [team] is allowed in carrying out task assigned by the organisation*’ (p.567). Therefore, when team autonomy is present, a number of associated behaviours can be expected to be present during team meetings. Firstly, it was hypothesised that the autonomy sub-dimension would be positively related to the degree to which a team appears confident in setting its own tasks and goals (item 1), demonstrates an ability to choose

how to carry out its work (item 2), and appears to ‘own their task’ (item 3). In turn, it was expected that the autonomy sub-dimension would be negatively related to the extent to which a team appears unable to confidently determine its own course of action (item 4), fails to make any firm decisions on its own (item 5), and seems unclear about what discretion it has in relation to making task-related decisions (item 6). The following hypotheses were therefore developed for testing;

*Hypothesis 7.24:* Scores on the autonomy sub-dimension will be positively related to behavioural observation items 1, 2 and 3.

*Hypothesis 7.25:* Scores on the autonomy sub-dimension will be negatively related to behavioural observation items 4, 5 and 6.

**Results.** Again, there were no significant relationships between the behavioural observations for the autonomy sub-dimension, and the team scores on the real team scale. Therefore, hypotheses 7.24 and 7.25 were rejected.

### **7.4.3 Discussion**

Validation study 4 has provided further evidence for the convergent and concurrent validity of the shared objectives, reflexivity and boundedness sub-dimensions of the real team scale. However, BOS scores from the team meeting transcripts did not find evidence for further validation of the dimensions of specified roles, interdependence and autonomy.

There are a number of limitations that should however be acknowledged. Firstly, as behavioural observation scales had to be developed for the purpose of this study, the validity of these scales is, in itself, arguable. Time constraints meant that a more rigorous BOS development was not possible. Therefore, it must be acknowledged that some of the behavioural observation items may have more closely captured a respective real team sub-dimension more accurately than others. Further, by analysing team interactions that occur during team meetings, it is arguable that what one is looking at is team *processes* in action. This may explain why this study found evidence for the validity of two of the real team sub-dimensions that are theoretically defined as team processes (shared objectives and reflexivity). In such qualitative data, it is more difficult to confidently capture what are traditionally conceptualised as structural aspects of the team such as autonomy and specified roles, unless these are explicitly manifested in behavioural team processes. For example, although the sub-dimension of boundedness is conceptualised as a team input, a manifestation

of boundedness could still be identified in the team meeting transcripts by looking for the how frequently the team's name is used for example. However, perceptions of team autonomy and team interdependence are more likely to exist within shared cognition or mental models of the team and manifest in the implicit coordination between team members, as opposed to explicit behavioural interactions. As a result these sub-dimensions were very tricky to capture in behavioural observation scales, and may account for why non-significant relationships were found. With regards to the specified roles sub-dimension, given the nature of the task of the business game, team roles were very clearly allocated to all members of teams at the beginning of the module. Therefore, there was little variance in the behavioural observation ratings relating to this sub-dimension. Hence the correlations were insignificant. It could also be argued that such clear and explicit role specification is unlikely to occur in most real-life organisational teams, and therefore these behavioural observation results are not necessarily representative of typical role-related interactions in work teams.

Overall, this study successfully employed the use of qualitative data to further validate three of the real team sub-dimensions. This mixed methodological approach allowed the research to gain an objective insight into what was actually happening in teams, and compare this with team-level scores on each of the real team sub-dimensions, in order to ensure that the new scale is a valid operationalisation of the real team construct.

## 7.5 VALIDATION STUDY 5

Validation study 5 aimed to further validate the shared objectives sub-dimension of the real team scale using the qualitative data from the open text boxes incorporated in sample 1 and 2 questionnaires. As outlined in chapter 5, participants in samples 1 and 2 were asked to write down three of their team's main objectives at the point of questionnaire completion. By comparing within-team written responses, the researcher was able to establish whether the team's aggregated scale score on the shared objectives sub-dimension was related to the level of specificity and agreement of team member's actual written objectives, as rated by an external rater. Two hypotheses were developed for investigation:

*Hypothesis 7.26:* Scores on the shared objectives sub-dimension will be positively related to expert ratings of agreement upon team objectives.

*Hypothesis 7.27:* Scores on the shared objectives sub-dimension will be positively related to expert ratings of specificity of team objectives.

### 7.5.1 Methodology

For data from samples 1 and 2, a different rater was trained to assess the written team objectives. Both expert raters worked within the field of organisational behaviour. However, they were not familiar with the research reported in this thesis. They were asked to read through each set of written team objectives and rate them on two items;

1. *This team demonstrates agreement upon their team objectives*
2. *This team demonstrates specificity in their team objectives*

Expert raters responded using a 5 point likert scale (1 = *strongly disagree*, 5 = *strongly agree*). For both samples, the researcher herself also blind-rated five sets of team objectives. Using the same approach as is outlined in study 4, an intra-class coefficient (ICC<sub>3,k</sub>) was calculated to ensure that there was sufficient IRR. For both samples, the recommended cut-off point was 0.70 was reached on the first occasion. Thus, no further training and required and the experts proceeded to rate the remaining sets of objectives for their respective sample.

### 7.5.2 Results

Support for the convergent validity of the shared objectives sub-dimension was provided by a significant correlation with ratings on the level of specificity of written team objectives ( $r = 0.33$ ,  $p < 0.05$ ) in the team-level data from sample 1. This suggests that teams which demonstrate higher levels of specificity in their written team objectives report more highly on the two real team items which measure the shared objectives sub-dimension. However, for sample 1, there was no significant relationship between the shared objectives dimension and ratings on the level of agreement of written team objectives, although the correlation coefficient was in a positive direction. With regards to sample 2, no significant results were found. Therefore, on the basis of the results from sample 1 only, hypothesis 7.27 could be accepted. However, hypothesis 7.26 was rejected for both samples.

### 7.5.3 Discussion

Results from validation study 5 provided some further evidence for the concurrent and convergent validity of the shared objectives sub-dimension of the real team scale. Teams in sample 1 that reported higher scores on this sub-dimension were also rated as having higher levels of specificity in their written team objectives. However, results were not consistent across the two samples. This may have been partly due to the difficulty of the expert rater

task in this study. The items required that the each rater make a judgement as the whether the team as a whole was in agreement, or demonstrated specificity in their team objectives. Therefore, if just one of two team members written objectives differed in some way, this would have significantly altered the experts rating of that team. Indeed, it is highly unlikely that at one point in time (i.e. the point of data collection) *all* team members demonstrated the same level of specificity and clarity over the team's main objectives. In real organisations, it is likely that some team members are newer to a team for example, or some team members where absent from a recent team meeting in which objectives were reviewed or agreed. What the coding process in this study could not account for is the *proportion* of team members that demonstrated similar levels of agreement and/or specificity.

Further, the written objectives from sample 2 were far more complex, varied and context-bound than those from sample 1. Teams in sample 2 were from all types of public sector services, and were engaged in a vast variety of different and highly specific tasks. The frequent use of acronyms and context-specific terminology meant that the written team objectives from sample 2 were difficult for an outside person to interpret, making direct comparisons between sets of team objectives much more difficult than in sample 1. Along with the larger number of teams ( $N = 63$ ), this gave room for a higher degree of error in the sample 2 ratings, which may partly explain why no significant results were found. Indeed, given that all teams in sample 1 were embedded in the same context, drawing direct comparisons between the sets of written team objectives was far less ambiguous.

Overall, the significant results established based on the sample 1 data provide further convergent and concurrent validation for the shared objectives sub-dimension in the real team scale. Therefore, it can be concluded that teams which reported that there was a higher level of agreement between team members on their teams objectives, as well as a higher level of commitment to these objectives also articulated their written team objectives in a more specific, consistent and concurrent manner.

## 7.6 VALIDATION STUDY 6

Establishing that a construct is theoretically distinct from other related constructs is another type of construct validity which is critical to establish for the new measure at hand (Campbell & Fiske, 1959). In order to establish discriminant validity, researchers commonly use CFA in order to examine whether a new construct is empirically divergent from related measures

(Chen et al., 2001). Indeed, it is plausible that a team will report highly on team realness simply because team members are satisfied with working in their team and express positive affect towards it. According to Tabachnick and Fidell (1989), when a correlation between two variables is above .80 statistical analyses will be affected by collinearity and multicollinearity. Although team-level correlations of team realness with team satisfaction did not exceed this level (sample 1  $p = .66$ ; sample 2  $p = .69$ ), they were still sufficiently high to warrant concern that these variables might overlap conceptually. Indeed, it is important to rule out the possibility that the report of team realness reflects nothing more than a respondent's satisfaction with their work team. Therefore, the following prediction would offer evidence of the discriminant validity of the real team scale:

*Hypothesis 7.28: Team realness will be distinct from team satisfaction*

Data from samples 1 and 2 was used for testing the hypothesis, as no data on the construct of team satisfaction was available from sample 3. Discriminant validity is established when a latent variable accounts for more variance in the observed variables associated with it than other related constructs. If this is not the case, then the validity of the individual indicators and of the construct itself is questionable (Fornell & Larcker, 1981). In order to examine the discriminant validity, the researcher conducted a CFA using AMOS in which team realness and team satisfaction were forced to overlap completely (one factor solution) versus a model in which they were allowed to be distinct (two factor solution). Evidence that the two factor model fits the data better than the single factor would support the structural and discriminant validity of the real team scale.

### **7.6.1 Results**

For sample 1, a 2-factor model with team realness and team satisfaction as separate but correlated factors ( $\chi^2 = 156.27$ ,  $df = 83$ ;  $TLI = .95$ ;  $CFI = .96$ ;  $RMSEA = .05$ ) fitted the data better than did a 1-factor model with team realness and team satisfaction collapsed ( $\chi^2 = 364.94$ ;  $df = 85$ ;  $TLI = .81$ ;  $CFI = .86$ ;  $RMSEA = .10$ ). Similarly for sample 2, a 2-factor model with team realness and team satisfaction as separate but correlated factors ( $\chi^2 = 165.04$ ,  $df = 83$ ;  $TLI = .98$ ;  $CFI = .98$ ;  $RMSEA = .04$ ) fitted the data better than did a 1-factor model with team realness and team satisfaction collapsed ( $\chi^2 = 517.86$ ;  $df = 85$ ;  $TLI = .88$ ;  $CFI = .91$ ;  $RMSEA = .09$ ). Overall, although team satisfaction and team realness are highly correlated, their psychometric structure is best fit by having a separate space for team realness, thus providing support for hypothesis 7.28.

However, when conducting CFA, one should not only consider the fit indices of the model along, but also the factor loadings for each observed variable, or in this case, the first order factors (Farrell & Rudd, 2009). Therefore, to further examine the discriminant validity of the new measure, the Fornell and Larcker (1981) test was applied, whereby the average variance extracted (AVE) from the six real team sub-dimensions was compared to the squared correlation between the second-order latent variables of team realness and team satisfaction. If the AVE is less than 0.5, then the validity of the six sub-dimensions, as well as the overall construct is questionable, as the measurement due to error would be larger than the variance captured by the construct (Fornell & Larcker, 1981). For both sample 1 and sample 2, the mean AVE across the six sub-dimensions exceeded this recommended level ( $p = .61$ ;  $p = .56$  respectively). Further, to fully satisfy the requirements for discriminant validity, the AVE must be greater than the squared correlation between the two latent constructs (Fornell & Larcker; 1981). The sample 1 data successfully met this condition with the squared correlation between team realness and satisfaction ( $p = .58$ ) being exceeded by the AVE ( $p = .61$ ). Fornell & Larcker (1981) also recommend that the squared correlation between the latent constructs should also be exceeded by the individual variance extracted by each first order factor. This condition was met by five out of the six real team sub-dimensions for sample 1 (shared objectives  $p = .83$ ; interdependence  $p = .61$ ; reflexivity  $p = .64$ ; autonomy  $p = .47$ ; boundedness  $p = .59$ ; roles  $p = .59$ ).

For sample 2, despite the mean AVE of the first order factors exceeding 0.5, the next condition for discriminant validity was not met, given that the squared correlation between team realness and satisfaction ( $p = .59$ ) was slightly higher than the average variance extracted ( $p = .56$ ). With regards to the individual variance extracted by each sub-dimension, the variances of shared objectives ( $p = .83$ ), reflexivity ( $p = .64$ ) and roles ( $p = .63$ ) exceeded the squared correlation between the two latent constructs, although this was not the case for the other three sub-dimensions (interdependence  $p = .54$ ; autonomy  $p = .26$ ; boundedness  $p = .49$ ).

### **7.6.2 Discussion**

Overall, despite the slightly inconsistent results with regards to conditions outlined by Fornell and Larcker (1981), the high CFI ( $> .95$ ) and low RMSEA values ( $< .06$ ) on the 2-factor models provide sound empirical support for the discriminant validity of the real team scale. Therefore reasons for the high correlations between the team realness and team satisfaction

could be attributed to common method variance or halo effects, which may have resulted in inflated correlations. However, the less convincing results from the Fornell and Larcker test suggest that evidence for discriminant validity between team realness and team satisfaction should be interpreted with a degree of caution, and it should be acknowledged that there may always be an inherent positive relationship between the two constructs. Given the high correlation, it is therefore reasonable to expect that they may share some of their predictive power over any theoretically relevant dependent variables.

## 7.7 VALIDATION STUDY 7

Results from the series of studies presented so far have provided promising evidence for the various types of validity of the real team scale. Although these results are a necessary part of scale validation, they do not provide evidence for the *utility* of the real team construct. It is therefore important to establish whether the real team scale can actually predict relevant outcomes, namely variables that capture aspects of team performance. Performance related variables were collected from each of the three samples reported in this thesis. For sample 1, financial performance data for each team was generated over the course of the business game simulation. For sample 2, external raters assessed team performance and team productivity at two time points; once at the point of the team member questionnaire, and once four months later. Finally, for sample 3, each team was allocated a percentage mark based on a written group assignment, which contributed to their overall performance on the postgraduate course.

### 7.7.1 Sample 1

As outlined in chapter 5, each team comprising sample 1 competed in a business game simulation, and thus generated objective financial data on a hypothetical three year basis. In examining the predictive validity of the new scale, the researcher tested whether team realness scores were significantly associated with financial performance at the end of the third year of the business game simulation. Indeed, existing models of team effectiveness propose that real teams, along with four other enabling conditions, lay the foundation for team performance and effectiveness (e.g. Wageman et al., 2005). It could therefore be expected that higher levels of team realness will be positively associated with improved team performance outcomes (see chapter 8, section 8.3.1.4 for a detailed discussion). For sample 1, return of capital employed (ROCE) was used for the financial performance measure. Therefore following hypothesis was tested.

*Hypothesis 7.29:* Team realness will positively predict ROCE in year 3.

In investigating hypothesis 7.29, a hierarchical regression (Cohen & Cohen, 1983) was carried out in order to establish whether team realness predicted a team's ROCE in year three. All predictor variables were standardised prior to analysis. The control variables of actual team size and meeting frequency were entered into the first step. Previous research has consistently demonstrated that team size impacts on team dynamics and performance outcomes (e.g. Brewer & Kramer, 1986; Smith et al., 1994; Wallmark, 1973). Team meeting frequency was also entered into step 1, as the extent to which a team interacts on a face-to-face basis has been shown to impact on the team processes and dynamics. For example, teams which have very few face-to-face interactions have been shown to be highly vulnerable to performance problems and processes losses (Gibson & Cohen, 2003; Lipnack & Stamps, 2000; Johnson & Johnson, 1989). Top management team meeting frequency has also been shown to impact on performance (Vafeas, 1999). Thus, controlling for team size and team meeting frequency ensured that the influence of these variables on the outcome variable remained constant. Another team-level variable that is commonly controlled for in team performance research is team age (or team tenure). However in sample 1, given that all teams were set up at the same time, it was not necessary to include this in the analysis. It was also impossible to control for questionnaire mode (i.e. paper/online) for sample 1, given that the mode chosen for questionnaire completion varied within teams and could therefore not be controlled for at the team-level. A measure of the ROCE at the end of year 2 was entered into the second step, thus controlling for previous performance. The third step contained the predictor variable of team realness.

#### **7.7.1.1 Results**

Results from the regression analyses indicated that team realness did not significantly predict ROCE (*Step 3*  $\beta = .16$ ,  $p = .17$ ,  $\Delta R^2 = .02$ ) in year 3 of the business game simulation. Hypothesis 7.29 was therefore rejected.

#### **7.7.1.2 Post-hoc analysis**

The researcher's familiarity the context of sample 1 prompted some post-hoc analysis. Despite the fact that performance in the business game simulation had an impact of each individuals overall course assessment (accounting for 10% of their final mark) it is still possible that the artificial construction of the business game task did not reflect the reality of a

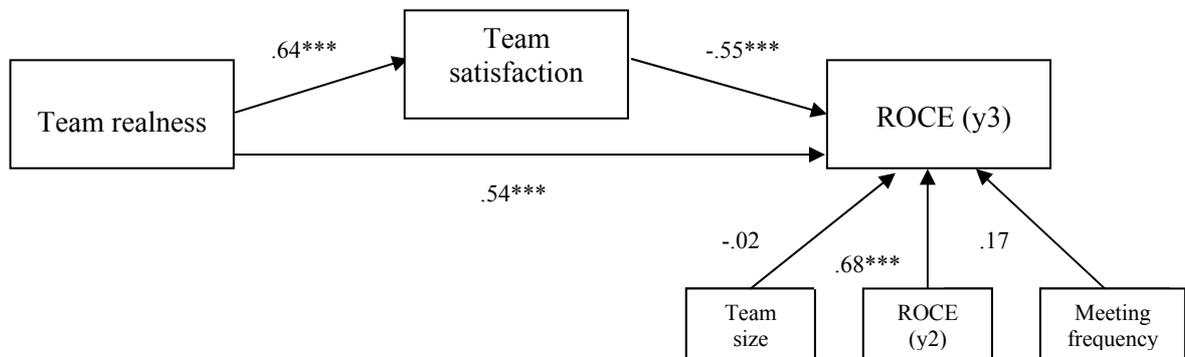
true real work scenario. Although team performance on the business game simulation had some personal relevance to the participants involved, it is also arguable that the implications were not taken as seriously as they would be in a real organisation setting. Commitment to and engagement with the business game simulation in undergraduate sample is likely to be more contingent on whether a given team has a particular interest in context of the simulation task (car manufacturing), enjoys using computer-based simulation programmes, and also whether team members were satisfied with working in their team, and felt that each team member contributed equally to the task. Therefore, some post-hoc analysis was conducted to ascertain whether team realness was indirectly related to team performance (ROCE) by a mediating variable of team satisfaction.

With regards to mediation, psychological researchers have traditionally followed the seminal work of Judd and Kenny (1981) and Baron and Kenny (1986). Baron and Kenny (1986) outline three steps of analysis in establishing mediation; firstly that the independent variable (IV) predicts the dependent variable (DV); secondly that the IV also predicts the mediator; and thirdly when the mediator is controlled for, a previously significant relationship between the IV and DV is no longer significant, with the strongest demonstration of mediation occurring when the path between the IV and DV is zero. Implicit in the third condition is the requirement of a significant relationship between the IV and the DV. Therefore, with regards to the analysis at hand, the insignificant effect of team realness on ROCE would deem any further testing of indirect effects redundant, at least from the perspective of the causal step model. However, researchers have recently argued this approach has several limitations (MacKinnon, Lockwood, Hoffman, West & Sheets, 2002). Firstly, it cannot provide a joint test of all three conditions for mediation. Also, one is unable to obtain a direct estimate of the size of the indirect effect of the mediator on the DV. And finally, the condition that there must be a significant relationship between the IV and DV may rule out 'inconsistent' moderating variable models in which the direct effect and indirect effect have opposite signs and therefore many cancel each other out (Mac-Kinnon, Krull, & Lockwood, 2000). Indeed, many authors (Collins, Graham, & Flaherty, 1998; Judd & Kenny, 1981; Kenny, Kashy, & Bolger, 1998; MacKinnon et al., 2000; Shrout & Bolger, 2002) have argued that a significant total effect of the IV on the DV is not necessary for mediation to occur. Mackinnon et al. (2002) argue that the best balance of statistical power and Type 1 errors occurs when the joint significance of the two effects comprising the moderating variable effects is tested.

Based on these recommendations, a mediation model (team realness → team satisfaction → financial performance) was tested. Although mediation is commonly tested using hierarchical regression, studies which use this approach must rely on the Sobel test (Sobel, 1982) to examine the significance of the indirect effect. However, evidence has suggested that the distribution of mediation effect is not normal (MacKinnon & Dwyer, 1993; Stone & Sobel, 1990), and therefore the utilization of the Sobel test (given that it assumes normal distribution) is not appropriate (Cheung & Lau, 2008). According to MacKinnon et al. (2004) the bias-corrected (BC) bootstrap method produces the most accurate confidence intervals. Bootstrapping is a nonparametric resampling procedure that does not impose the assumption of normality of the sampling distribution (Cheung & Lau, 2008). Indeed, bootstrapping is frequently advocated as the more sophisticated and preferred method for testing indirect effects in simple mediation models (e.g. Preacher & Hayes, 2004, 2008). The mediation was therefore tested in AMOS.

As Figure 7.1 demonstrates, team realness was significantly related to team satisfaction, ( $\beta = 0.64, p < 0.001$ ), and team satisfaction was significantly related to ROCE ( $\beta = -0.55, p < 0.001$ ).

**Figure 7.1: Estimated coefficients for the mediating model**



*Note:* Standardized structural coefficients are reported.

To provide empirical support for the mediation of team satisfaction, the indirect effect of team realness in the SEM was requested (MacKinnon et al., 2002). The bootstrapping option in AMOS was used to generate standard errors and 95% confidence intervals for the indirect effect. The results showed that the standardized indirect effect of team realness on ROCE (year 3) was  $-0.38$  ( $p < 0.01$ ). However, the negative coefficient of this indirect effect suggested the presence of a multicollinearity effect. If two variables are highly correlated, as team realness and team satisfaction are, then the coefficient of one of them can often appear the ‘wrong’ way round when both variables are included in the regression analysis. This explains why the coefficient of team satisfaction on ROCE is negative. As the indirect effect

is a product of the two paths (i.e. team realness → team satisfaction and team satisfaction → ROCE), this explains why the indirect effect of team realness on ROCE is also negative. Overall, the multicollinearity effect means that this indirect effect should not be treated as theoretically meaningful; in fact, the direct effect of team realness on ROCE should be treated with far more importance, given that the coefficient sign is in the expected direction.

### 7.7.2 Sample 2

The dependent variables in the organisational sample were manager ratings of team performance and team productivity. Team performance is a subjective or objective judgement of to what extent a team meets valued objectives (Salas et al., 2009), and is one of the most well accepted indicators of team effectiveness (Hackman, 1987). Another frequently cited measure of work team effectiveness is productivity (e.g. Banker et al., 1996; Cohen & Ledford, 1994; Pearce & Ravlin, 1987; Shea & Guzzo, 1987). In sample 2, longitudinal team performance and productivity ratings were collected from managers within the organisation who were outside of the participating team, but were familiar with the team and their performance. Approximately four months after the collection of the team member data from sample 2, the same external managers who had rated the teams at time 1 completed a second questionnaire. This second questionnaire required the managers to re-rate the given team on team productivity and team performance, based on the past four months (i.e. over the period since time 1 data collection).

Cronbach's alpha coefficients for team performance at time 1 and time 2 were 0.90 and 0.92 respectively, with mean values of 3.64 ( $SD = 0.73$ ) and 3.79 ( $SD = 0.79$ ). Cronbach's alpha coefficients for team productivity at time 1 and time 2 were 0.87 and 0.86 respectively, with mean values of 3.87 ( $SD = 0.62$ ) and 3.90 ( $SD = 0.61$ ). Forty three teams from sample 2 yielded sufficient data from both team members and team raters to be included in validation study 7. Following the same theoretical deduction outlined for the previous hypothesis (see section 7.7.1), the researcher examined whether the team realness scores provided by teams at time 1 were associated with managers ratings of team performance and team productivity four months later. Hence, the hypotheses were as follows;

*Hypothesis 7.30:* Team realness will positively predict subsequent team performance four months later, as rated by external managers.

*Hypothesis 7.31:* Team realness will positively predict subsequent team productivity four months later, as rated by external managers.

In investigating hypotheses 7.30 and 7.31, team-level data was again treated with hierarchical regression analyses. All predictor variables were standardised prior to analysis and the same control variables (team size and team interaction frequency) were entered into step 1. As has already been discussed, another team-level variable that is commonly controlled for in team research is team age (or team tenure), as it is arguable that teams which have been formed for longer periods of time will have established higher levels of coordination, control, and familiarity and are therefore more likely to perform better (Smith et al.1994; Hackman, 2002). However, there were two key reasons why team age was not controlled for in this analysis. Firstly, the categorical measure used to assess team age in the sample 2 questionnaire captured very little variance between the participating teams. Of the 43 teams included in this analysis, one (1.7%) was less than twelve months old, one (1.7%) was between one and two years old, and 41 (96.7%) were more than two years old. A one-way analysis of variance (ANOVA) revealed no significant differences among these team age categories with respect to the dependent variables of team performance and team productivity (all  $F$ -tests were non-significant). As no differences were found on the outcome variables, a control variable of team age was not included. ANOVAs also confirmed that there were no differences in team realness, team productivity or team performance between the twelve directorates within the participating organisation. Therefore the directorate to which a team belonged was not included as a control variable. Similarly, there were no significant differences between teams who completed the online version of the questionnaire compared to those who completed a paper-based version, so questionnaire mode was not controlled for. Given the relatively small sample size ( $N = 43$ ), excluding these unnecessary control variables this helped to preserve the largest number of degrees of freedom possible. With regards to the hierarchical regression itself, following the approach used with sample 1, a measure of the dependent variable (team performance/team productivity) at time 1 was entered into the step 2 to control for stability effects. Finally, the third step contained the predictor variable of team realness.

### **7.7.2.1 Results**

As can be seen in table 7.6, results from the hierarchical regression analyses indicated that, after controlling for team size, team interaction frequency and a measure of the outcome variable at time 1, team realness was significantly associated with managers ratings of team performance (*Step 3*  $\beta = .23, p < .05, \Delta R^2 = .08$ ) and team productivity (*Step 3*  $\beta = .14, p < .05, \Delta R^2 = .05$ ) four months later, thus yielding substantial support for hypotheses 7.30 and 7.31.

The inclusion of team realness in step 3 accounted for 8% of the variance in team performance and 5% of the variance in team productivity. Thus, hypotheses 7.30 and 7.31 were accepted.

#### **7.7.2.2 Post-hoc analysis**

As with sample 1, post-hoc analysis was again conducted to explore the impact that team satisfaction had on team productivity and team performance. Indeed, given the high correlation between the two variables, one might expect the two constructs to share some of the variance on the dependent variable. Despite this, team satisfaction did not significantly predict team productivity at time 2 (*Step 3*  $\beta = .20$ ,  $p = .08$ ,  $\Delta R^2 = .04$ ). This result provides further convincing evidence that the construct of team realness is not simply a surrogate measure of team satisfaction or an artefact of positive affect, but instead captures something unique about a team's fundamental structure and processes. However, slightly different results were found on the regression for team performance. When treated as an IV, team satisfaction did significantly predict team performance at time 2 (*Step 3*  $\beta = .37$ ,  $p < .05$ ,  $\Delta R^2 = .14$ ). A mediation model (team realness  $\rightarrow$  team satisfaction  $\rightarrow$  team performance) was therefore tested in AMOS to check for indirect effects.

However, a bootstrap test of the indirect effect was insignificant; suggesting that team satisfaction does not mediate the relationship between team realness and team performance in the sample of organisational teams.

**Table 7.6: Hierarchical regression in the prediction of team performance and productivity**

	R <sup>2</sup>	adj R <sup>2</sup>	ΔR <sup>2</sup>	β	R <sup>2</sup>	adj R <sup>2</sup>	ΔR <sup>2</sup>	β
	Team Performance at time 2				Team Productivity at time 2			
Step 1	.08	.03	.08		.13	.08	.13	
Team size				-.21				-.22
Team meeting frequency				-.10				-.03
Step 2	.34	.28	.26		.55	.52	.43	
DV at time 1				.50***				.45***
Step 3	.41	.35	.08		.60	.55	.05	
Team realness				.23*				.14*

N=43 teams †  $p \leq .10$  \*  $p \leq .05$  \*\*  $p \leq .01$  \*\*\*  $p \leq .001$

Note: The values presented are the unstandardised  $\beta$  coefficients at each stage of the regression equation. Due to rounding off  $R^2$  may differ .01 from the sum of  $R^2$  change.

### 7.7.3 Sample 3

With regards to team performance data for sample 3, at week seven of the nine week course, all of the postgraduate teams submitted a group assignment based on the project they had been working on. The group mark that they were awarded for this assignment had personal relevance to all of those enrolled on the course, as it counted towards their final assessment. Each group assignment was blind marked by the module leader and two other lecturers who taught on the course. Cross marking was carried out on 20% of the assignments to ensure that marking was consistent. Each team received a percentage score. In terms of analysis, as team realness was captured over three time points, it was possible to explore whether the construct varied over time, and if so, whether this change impacted team performance. Therefore, sample 3 data was initially treated with latent growth modelling in AMOS. However, results indicated that there was no significant change in team realness over time, given the presence of a non-significant slope. This was perhaps due to the short time frame over which the three waves of data were collected. Therefore, the researcher decided to only focus on team realness scores from one of the three time points for the purposes of establishing predictive validity. As the group assignments were already submitted one week before the time 3 data collection, team realness scores at time 2 were deemed as the most appropriate in terms of predicting team performance. At time 1, as the ICC results presented earlier in this chapter indicated, there was very little variance in team realness between the teams. Further, at time 3, the group assignment has already been submitted, and therefore group processes would no longer be orientated towards the particular task on which the performance data was based. Therefore, according to the same theoretical reasoning used in the previous two hypotheses linking team realness and team performance (see section 7.7.1), the following hypothesis was developed in relation to team realness at time 2;

*Hypothesis 7.32:* Team realness will positively predict percentage scores on the group assignment.

In investigating hypothesis 7.32, hierarchical regression analysis was carried out in order to establish whether team realness predicted team performance on the group assignment, based on the percentage mark awarded. All predictor variables were standardised prior to the analysis. The control variables of team size (as before) and class cohort were entered into the first step. Given the size of the module, teams were split into four separate class cohorts, each of which was taught the same content, but by a different lecturer. Controlling for class cohort ensured that the possible influence of different lecturers did not

impact on a team's performance in the assignment. As with sample 1, it was not necessary to control for team age, given that all teams had been formed for the same amount of time.

### 7.7.3.1 Results

As can be seen in table 7.7, results demonstrated that team realness was significantly and positively associated with team performance on the group assignment (*Step 2*  $\beta = 1.83, p < .05, \Delta R^2 = .10$ ). The inclusion of team realness in step 2 accounted for 10% of the variance in team performance on the group assignment. Hypothesis 7.32 could therefore be accepted.

**Table 7.7: Hierarchical regression in the prediction of group assignment scores**

	$R^2$	adj $R^2$	$\Delta R^2$	$\beta$
Group assignment score				
Step 1	.05	.01	.05	
				Team size
				Class cohort
Step 2	.15	.09	.10	
				Team realness (time 2)

N=52 teams †  $p \leq .10$  \* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

Note: The values presented are the unstandardised  $\beta$  coefficients at each stage of the regression equation. Due to rounding off  $R^2$  may differ .01 from the sum of  $R^2$  change.

### 7.7.4 Discussion

As has been discussed throughout this thesis, the use of teams in organisations is based on the premise that teams can achieve a level of synergy which allows them to perform complex multi-faceted tasks that cannot be achieved by individuals alone. The very reason why teams became the preferred work design choice in the first place stemmed from the notion posited by socio-technical systems theory (Cummings, 1978; Lewin, 1951; Trist, 1981), which argued that autonomous work groups are the optimum method for combining social and technical aspects of work in a manner which is most likely to optimise performance. Teams are implemented to enhance performance and therefore, by definition, real teams should be high performing (if all else is controlled for). Indeed, thinking back to the results of chapter 3, healthcare teams which were characterised by a number of crucial real team components, all of which are incorporated into the new real team construct used here achieved the most favourable work-related safety outcomes. Using the new and extended operationalisation of the real team construct, validation study 7 has demonstrated the utility of the scale and has

provided further promising evidence for the link between team realness and team performance. The more *real* a team is, the more likely it is that the team will achieve its intended outcome. Indeed, data from teams which comprised samples 2 and 3 provided consistent empirical support for the predictive validity of team realness. Post-hoc analysis from sample 1 also suggests that a similar relationship exists between team realness and objective financial performance, although it should be noted that this analysis was affected by multicollinearity and was based on a somewhat artificial student sample. However, a methodological strength of validation study 7 is the source of the dependent variables. Across the three samples, team performance data was sourced from outside of the team itself, and therefore the possibility these results are due to common method variance is substantially reduced.

## 7.8 CONCLUSION

Validation studies 3 to 7 aimed to further validate the twelve-item real team scale using a variety of related team-level scores. Validation study 3 found evidence for the concurrent and convergent validity of three team realness sub-dimensions (reflexivity, interdependence and autonomy) using self-validation measures. Using qualitative data from team meeting transcriptions, study 4 used expert ratings to establish convergent and concurrent validity for the sub-dimensions of shared objectives, reflexivity and boundedness. The shared objectives dimension was further validated in study 5 using expert ratings of the specificity of written team objectives.

The final two studies focused on the overall measure of team realness. Study 6 provided sound empirical support for the discriminant validity of the new scale, in relation to the construct of team satisfaction. Finally, study 7 explored the utility of the real team scale and found evidence for its predictive validity. Specifically, in a sample of organisational teams, team realness had a direct positive effect on team performance and team productivity, as rated by outside team managers four months later. Data from student teams also provided encouraging evidence; the team realness of a sample of postgraduate teams directly predicted their performance in a group assignment; and the team realness of a sample of undergraduate teams directly predicted financial performance on a business game simulation when team satisfaction is included in the regression. Taken together, the results of studies 3 to 7 provide consistent and sound empirical validation (of various types) for the twelve-item real team scale across three samples of teams.

## **Chapter 8: Discussion and conclusion**

### **8.1 CHAPTER SUMMARY**

This chapter provides an overall discussion of the findings of this thesis. A brief summary of the main aim of this research, along with the major findings from across the studies is firstly provided. As focused discussions relating to each study were provided at the end of the respective sections throughout this thesis, these should be kept in mind when interpreting the overall findings presented here. Following this, a large section of the chapter is dedicated to the discussion of the potential contribution to knowledge that this thesis provides. This includes both theoretical and methodological contributions to the literature on teams, as well as practical contributions that can be used to inform teams and organisations. Following this, overall limitations and caveats of the research are considered, before outlining the main areas for future research. The chapter closes with the overall conclusions from this thesis.

### **8.2 MAIN FINDINGS**

The aim of this thesis was to explore the prevalence, importance and measurement of real teams in organisations, and to develop a new and extended theoretical construct which could be operationalised into a short, valid and reliable scale. In investigating the prevalence of real teams, a large sample of recently collected secondary data provided strong and consistent evidence for the beneficial effects of real team working on work-related safety outcomes in the context of NHS (chapter 3). Findings demonstrated that if NHS staff identify as working in a team, yet their team lacks clear objectives, reflexivity and interdependence, then any arguments for the beneficial outcomes of team-based working, at least in terms of important work-related safety outcomes, appear to be redundant. In the context of UK healthcare, if teams do not meet the criteria of real teams presented in chapter 3, then it would be in the interests of all parties concerned for NHS staff to work on an individual basis rather than in a pseudo-team fashion. The three real team criteria employed in this first study (clear objectives, interdependence and reflexivity) all demonstrated to have important theoretical relevance in characterising the types of team that *should* be operating in NHS organisations. The presence of clear objectives and reflexivity were particularly important in the reduction of work-related safety outcomes. However, despite these important findings, a number of theoretical and methodological limitations associated with this first study meant that further research was necessary to gain a more comprehensive and rigorous approach for conceptualising and measuring real teams.

Chapter 4 therefore provided a new definition for measuring the real team construct, arguing that real teams are defined by six key properties which vary on a continuum; shared objectives, interdependence, reflexivity, autonomy, boundedness and specified roles. Based on theoretical deduction and the incorporation of recent conceptual trends in team research, these six sub-dimensions capture key structural and process characteristics that define real teams in the literature. Following the presentation of the theoretical model, seven validation studies were conducted to exclusively explore the internal and external validity of the newly operationalised construct. Analysis was based on three samples of teams comprising of responses from over 1200 team members. Although approximately half of these respondents were working as part of postgraduate or undergraduate teams, over 600 belonged to work teams from a large public sector organisation. As shall be discussed, the variety of these samples and the types of team represented within them offers some initial support for the generalisability of the construct of team realness. In terms of validity, table 8.1 summarises the specific types of validation that were confirmed over the course of the seven studies.

**Table 8.1: Summary of validation types established**

Validation Study	Content Validity		Construct Validity		Criterion-related Validity	
	Structural	Face	Convergent	Discriminant	Concurrent	Predictive
Study 1	✓	✓				
Study 2	✓	✓				
Study 3			✓		✓	
Study 4			✓		✓	
Study 5			✓		✓	
Study 6				✓		
Study 7						✓

In terms of the psychometric soundness of the new scale, initial reliability results are encouraging; with the average coefficient alpha for the twelve-item scale exceeding 0.80. As can be seen from table 8.1, the results for the validity of team realness, albeit initial, are also encouraging. As was outlined in chapter 5, the scale development process closely followed existing advocated approaches (DeVellis, 2003; Hinkin, 1995, 1998) and was guided by a mixed-methodology paradigm which allowed for a concurrent triangulation strategy (Creswell, 2009). Further, a variety of different methods were used to cross-validate various real team sub-dimensions, including the splitting of datasets into subsamples, as well as the utilisation of various types of qualitative and quantitative concurrent data which could be triangulated with the real team scale scores (cf. Creswell, 2009).

Evidence for the content validity of the measure was established in studies 1 and 2, in which factor analysis techniques were used to refine the scale and test its second-order factor structure against competing models. Input from subject matter experts during the refinement of scale also added to the content validity. Results demonstrated that responses to the twelve-item scale could be explained by six first order factors, which in turn were explained by a single second-order factor of team realness. The final version of the scale was then subjected to further testing on the basis of its six sub-dimensions, and demonstrated good psychometric properties. Using self-validation data, study 3 provided empirical support for the convergent and concurrent validity of the sub-dimensions of interdependence, reflexivity and autonomy. However, it was acknowledged that common method variance may have inflated the significance of these results. Therefore, study 4 aimed to further validate the individual real sub-dimensions using qualitative data from team meetings. The use of expert ratings on behavioural observation scales provided further evidence for the convergent and concurrent validity of reflexivity, as well as for the shared objectives and boundedness sub-dimensions. However, no significant results were found for the other three real team sub-dimensions in this study, perhaps due to the difficulty in capturing these constructs as observable behaviours that occur in the context of a typical team meeting. The shared objectives sub-dimension was further validated in study 5 using expert ratings of the specificity of written team objectives. Again this outside rating source served to reduce the possibility of common method variance inflating the correlations. Overall, sufficient convergent and concurrent validity was established for five out of the six real team sub-dimensions, with the exception of specified roles. As was discussed in chapter 7, teams in sample 1 had been advised to allocate specific roles to team members at the beginning of the business game simulation. Given this explicit role delegation, expert raters reported very little variance in this behavioural observation scale when rating the team meeting transcripts. As will be discussed later in this chapter, this calls into question the artificial nature of the business game simulation task and to what extent findings from sample 1 are applicable to organisational teams in real life settings. Therefore, the convergent and concurrent validity of the roles sub-dimension requires further attention in future research.

The final two validation studies, studies 6 and 7, were concerned only with the overall measure of team realness. Validation study 6 focused on establishing discriminant validity. Although it is acknowledged that the correlation between team realness and team satisfaction is high, results from a series of confirmatory factor analyses indicated that the scales are sufficiently distinct on the basis of their fit indices, thus suggesting that they tap empirically into two different constructs. However, it is acknowledged that not all of the conditions for

discriminant validity outlined by Fornell and Larcker (1981) were met. Again, it is arguable that the common source of the data may have inflated the relationship between the two latent variables. It is therefore reasonable to conclude that the construct of team realness, although tapping into aspects of team satisfaction, more sharply captures the actual structural and process characteristics of a team, some of which have not previously been assessed by existing real team measures, such as that of Wageman et al. (2005). Finally, validation study 7 established initial support for predictive validity of the new scale, with team realness positively predicting team performance and team productivity, as rated by outside managers four months later (sample 2). Data from a sample of postgraduate student teams (sample 3) also supported this predictive relationship. However, the undergraduate sample of teams generated slightly different results, whereby the relationship between team realness and financial performance was affected by multicollinearity with team satisfaction. However, as will be discussed later, it is arguable that the data from the organisational team sample (sample 2) should be given the most weight, given its real life setting.

To summarise, validation of each major type, content, construct and criterion-related, was successfully established across the seven validation studies. It is acknowledged that patterns of validation were not necessarily consistent across the three samples of data, or indeed across the six real team sub-dimensions. However, taken together, these initial results are highly encouraging. The contribution of the new real team construct to the existing team literature will now be considered.

## **8.3 CONTRIBUTION TO KNOWLEDGE**

### **8.3.1 Theoretical contributions**

One reason why team researchers have been unable to arrive on a shared mental model on the science of teams (Salas et al., 2007) is likely to be that team scholars have been studying all sorts of ‘teams’ in organisations; many of which do not conform to what we conceptualise as a team in the literature. Very often, researchers apply the term ‘team’ with seemingly indiscriminate use, simply assuming that the collectives we study are interchangeable in terms of their basic structure and processes. As the very best, researchers might control for one or two fundamental team characteristics in their analysis. However, with exception of Hackman (2002), there remains no operationalised definition of real teams that can be applied practically in a research context. Further, as was discussed in chapter 4, Hackman’s (2002)

operationalisation of real teams exists as part of a larger team effectiveness measure (the Team Diagnostic Survey; Wageman et al., 2005), is rarely used in isolation, and has not to my knowledge been subjected to any sort of rigorous validation as a separate construct. Further, at the end of their paper, Wageman et al. (2005) note that *'The Team Diagnostic Survey is intended for use with intact teams that perform work in a social system context, not groups that are teams in name only'* (p.395). But as team researchers, how would we really know that 'teams are not in name only' unless we have actually measured it? Based on the lack of research into such a fundamental measure, it is argued that team research has continued to bloom without a coherent and thorough understanding about what defines the subject of our science. Indeed, results from chapter 2 provide clear evidence for the importance of defining the subject we wish to study, whereby pseudo-team typologies (which are teams by name only) predicted remarkably worse work-related safety outcomes than real teams, and more worrying, consistently poorer outcomes than individuals who did not identify as working in a team at all. It seems that we may have forgotten what work teams were originally intended to look like, therefore assuming that any sort of 'team' will be appropriate for our research. As was discussed in chapter 4, when asking managers to identify teams for study, we too often assume that these 'creatures' are the ones which we want to do research with. We do not test to what extent the collective in front of us is actually a team. As a result, we are making positivist claims on the basis of socially constructed understandings of managers or our own subjective judgments, meaning that our results are often unclear and inconsistent.

Up until now, some team researchers have confronted these difficulties by clearly defining the focal unit of a real team (e.g. Hackman, 1990; 2002). Such efforts have been invaluable in guiding the development of coherent theories around teams. However, despite having such clear conceptual definitions to guide us, it is likely that in practice, as team researchers going out to conduct our fieldwork in organisations, we will still experience some ambiguity when identifying focal units for study (Hitt et al., 2007), particularly if all we have to rely on in our own subjective observations or the opinions of managers. Indeed, getting a large enough sample for quantitative team-level research is challenging enough, often leaving us to be less scrupulous in identifying 'teams' for our studies. A validated scale for testing the extent of team realness therefore will not only provide a critical insight into the fundamental structure and teamwork processes of the teams we choose to study, but would also facilitate the convergence of findings across team research in a more coherent and informed manner. By extending existing conceptualisations to provide a multi-dimensional theoretical model of real teams, and operationalising this construct across three team samples, this thesis has

provided a short, yet parsimonious scale which will allow team researchers to achieve such clarity and convergence in future.

As shall be discussed in the following sections, the real team model was guided by three underlying theoretical perspectives, interdependence theory, social identity theory and self-regulation theory, which together explain why organisations structure their work in teams, and thus why people work in teams in the first place. In order to build on current approaches, the new definition of real teams was grounded in existing definitions but has also contributed further to our understanding of the construct by incorporating recent trends in the literature to define teams as adaptive self-regulating systems (Kozlowski & Ilgen, 2006; McGrath et al., 2000; Salas et al., 2007). This new conceptualisation has also acknowledged that real teams should be understood on a continuum, given that the properties which traditionally define teams are continuous in nature. Each of these extensions to our understanding of real teams will now be discussed in further detail, before considering where the construct fits into existing theories and models of team effectiveness.

#### ***8.3.1.1 Underlying theoretical perspectives***

The real team model was guided by three powerful theoretical perspectives on teams; interdependence theory, social identity theory and self-regulation theory. In isolation, each of these theoretical perspectives has helped to underpin our understanding of teams in organisations. However, up until now they have not been incorporated into the same theoretical model, whereby they are treated as related and complementing aspects of a wider conceptual framework which underpins what real teams are.

Both interdependence theory and social identity theory have been used for many years to guide team research. From the perspective of interdependence theory, the very essence of a team is the interdependence between its members (Lewin, 1948). Cooperative interdependence explains why so many organisations are structured in teams, and indeed, why humans have worked in groups for thousands of years. Such interdependence implies that members of a group quite simply *need* each other for a given purpose (i.e. to achieve tasks and/or goals), and this explains why people work in teams. This theoretical perspective therefore underpinned the inclusion of interdependence and shared objectives into the real team model. Secondly, social identity theorists argue that identification is what defines the essence of ‘groupness’ (Hogg, 2006). From the social identity perspective, a team is psychologically real only when team members identify with it. *‘Social identity is the cognitive*

*mechanism which makes group behaviour possible*' (Turner, 1982; p. 21). Social identity theory therefore provides a second powerful theoretical perspective which guided this research and explicitly underpinned the inclusion of boundedness and specified roles into the real team model.

A third theoretical insight which offers a new perspective for conceptualising real teams stems from the self-regulation perspective. Socio-technical systems theory posits that the primary mechanism by which group task design influences outcomes is through team self-regulation (Cohen, 1993). In designing effective relationships between the technical and social components of a task environment, teams require a sufficient amount of autonomy to exercise self-regulation and take internal control of their work structure. Extending self-regulation theory to the team-level of analysis, it is arguable that from this theoretical perspective teams are only real teams in the extent to which they collectively regulate their behaviour and continuously talk about what they are doing as a team. This requires that they observe and reflect upon their performance and processes, and implement appropriate self-directed change. Kozlowski et al. (1996) define team self-regulation '*an understanding of how to coordinate member actions, engage in error detection, and monitor each other's performance, so the team can balance workloads and stay on track toward stated objectives*', (p. 276). A self-regulation perspective on real teams not only directly underpins the inclusion of shared objectives, autonomy and reflexivity into the real team model, but is also consistent with recent trends in the literature to define teams as adaptive (see section 8.3.1.2). Indeed, the sub-dimensions of shared objectives, autonomy and reflexivity each generated sufficient empirical validation for the inclusion into the real team model.

Overall it is proposed that the construct of team realness cannot be adequately understood by any one of these three theoretical perspectives in isolation. Multiple facets, namely the six real team sub-dimensions, collectively define a real team, its nature and workings. Therefore, the combination of these three theoretical perspectives has provided a powerful and novel conceptual framework for the development of the real team construct, serving to integrate previously separate perspectives into a more inclusive and current model to define real teams.

### **8.3.1.2 Real teams as adaptive teams**

The conceptualisation of real teams presented in this thesis offers an extension of existing attempts (e.g. Hackman, 2002), which typically define real teams in rather static terms and do

not acknowledge the dimension of adaptability. Recent research trends that view teams as complex, adaptive, dynamic systems have opened up new opportunities for defining and studying work groups (McGrath et al., 2000). For example, Kozlowski and Ilgen (2006) state that *'teams are complex and dynamic systems that exist in a context, develop as members interact over time, and evolve and adapt as situational demands unfold'* (p.78). Similarly, in Salas et al.'s (2007) most recent definition, teams are defined as those which interact adaptively. In a review of the team effectiveness literature, Ilgen et al. (2005) confirm that *'conceptually, team researchers have converged on a view of teams as complex, adaptive, dynamic systems'* (p.519; also see McGrath et al. 2000). Adaptability also featured as one of Salas et al.'s (2005) 'Big Five' in their recent model of team effectiveness. However, until now, the concept of adaptability has not been explicitly represented as a core property which defines real teams. Indeed, McGrath et al. (2000) argue that much of the research on groups and teams has been carried out on the implicit premise that groups are simple static entities. Most crucially they argue that the field has reached its limit in terms of what can be learnt unless a unifying conception of groups which recognises their adaptive nature is developed. This thesis has attempted to address this research need by incorporating the dimension of team reflexivity into the real team construct. Reflexivity is a fundamental teamwork behaviour which represents team self-regulation as a behavioural teamwork process, whereby team members discuss their current progress towards a shared objective, review the suitability of the objective itself, and adapt their processes and strategies accordingly (West et al., 2004). Joint reflexivity is a natural gateway to collectively defining and refining shared objectives and initiating change and adaptability. It is also a necessary process for ensuring that team objectives are understood and shared, whereby team members develop a collective mental model of their task which evolves as circumstances change over time. The real team definition provided here acknowledges the adaptive nature of work teams by incorporating reflexivity into the construct definition. The new construct therefore serves to extend existing approaches, namely that of Hackman (2002), which does not acknowledge the adaptive nature or self-regulation that is inherent in real work teams in organisations today.

### **8.3.1.3 Real teams as a continuous construct**

Many existing definitions of real teams have relied on the assumption that a clear dichotomy can be drawn between teams which are real teams and those which are not (e.g. Katzenbach & Smith, 1998). From a methodological perspective, existing conceptualisations share a similar problem with regards to distinguishing real teams from other team typologies. Indeed, none of the existing attempts described in chapter 4 provide an indication of a threshold or cut-off

point where co-acting groups or pseudo teams stop and real teams start. This leaves the reader to assume that a dichotomy exists between teams that demonstrate the properties of real teams, and those who simply do not. However, given that the characteristics which are used to define real teams are continuous in nature, this thesis acknowledges that a simple dichotomy between real and pseudo teams is unlikely to be found. Indeed, McGrath et al. (2000) point out that researchers must accept the idea that not all entities which fit team or group definitions are alike, calling for more useful taxonomic systems which allow researchers to make distinctions between different types of group.

A categorical approach for defining real and pseudo team typologies was used in the chapter 3 study, given that the National NHS Staff Survey from which the data was drawn used a binary response scale. Despite generating theoretically interesting results, a key limitation of this study was that the binary nature of the responses did not allow for degrees of difference within each team typology. Therefore, it had to be assumed that all teams which fell into the 'real team' category were interchangeable in terms of their levels of the real team sub-dimensions, which is highly unlikely to be the case in reality. It is therefore argued that the dichotomous distinction between real teams and pseudo teams adopted in chapter 3 cannot have represented the construct adequately. The continuum approach of the real team scale proposed subsequently allows there to be degrees of difference, as opposed to fundamental divergences between teams (Guzzo & Dickson, 1996). It therefore acknowledges that teams in organisations are not necessarily interchangeable; nor are they simply 'real' or 'pseudo'. In fact each team will vary on the extent to which they have shared objectives, interdependence, reflexivity, autonomy, boundedness and specified roles, and that this has important theoretical implications not only for internal team functioning but also for drawing comparisons between teams. As each of these sub-dimensions is considered in the literature as a continuous phenomenon with various sensitivities, they should be measured accordingly. When taken as an average score, aggregated team level scores on the new scale indicate to what extent a team meets the criteria which define a real team. Thus, team realness is not an all or nothing concept and can change over time, task and context. Therefore, addressing whether team realness is a matter of degree, rather than a matter of 'presence' or 'absence' provides new epistemological scope for researching teams in organisations.

#### ***8.3.1.4 Integration with existing theory and research***

As was discussed in chapter 2, the majority of team research is structured around the input-process-output model (IPO); a framework originally proposed by McGrath (1964). It is

therefore important to establish how the real team construct fits into existing team effectiveness models which are typically structured in this format. The most widely known model remains as Hackman's (1987) normative model of team effectiveness, which proposes that input factors (group design and organisational context) are related to team processes (process criteria of effectiveness), which in turn impact on team effectiveness, with this relationship being moderated by the availability of material resources. Given that the sub-dimensions of the real team model span both inputs (boundedness, autonomy and specified roles) and processes (shared objectives, interdependence and reflexivity) it is acknowledged that the overall real team construct presented here does not fit neatly into either input or process categories of many existing team effectiveness models. However, it can map directly onto Hackman's (2002) more recent model of team effectiveness which is recognised as being less conventional and more idiosyncratic in nature, given that it does not follow the traditional IPO framework for conceptualising research into teams'. Rather than positing that inputs are linked with outputs via mediating processes, this model instead views teams as semiautonomous social systems that interact with the wider organisational context and adapt over time in their own unique ways. Team effectiveness is therefore facilitated through five enabling conditions (Wageman et al., 2005);

- 1) *That the team is a **real team** (rather than a team in name only)*
- 2) *There is a compelling direction for the teams work*
- 3) *The structure of the team facilitates collective work*
- 4) *The organisational context supports team task activities*
- 5) *Team coaching is available to enhance team performance*

Although somewhat different to Hackman's (2002) conceptualisation of real teams, the real team construct proposed here maps directly onto the first condition of the recent team effectiveness model above, although it also picks up on features from the second and third conditions. Indeed, the sub-dimension of shared objectives taps into the second condition which specifies that there should be a compelling direction for the teams work. Further, the third condition which specifies that the structure of a team should facilitate collective work taps into the interdependence sub-dimension of the real team model. However, as previously discussed, the new real team construct extends Hackman's (2002) original conceptualisation by incorporating the self-regulation aspect of reflexivity, as well as other key sub-dimensions which were not incorporated previously. Further, in order to more accurately define teams which exist in today's organisations, Hackman's sub-dimension of membership stability was not incorporated for two reasons. Firstly, this property did not feature explicitly in any other

of the team definitions reviewed in the content analysis stage of scale development (see chapter 4), and it was therefore concluded that membership stability does not traditionally feature as a characteristic of teams as typically defined in the literature. Secondly, the complex tasks and high demands placed on organisations today mean that some teams are disbanded just as quickly as they are assembled. Therefore, many work teams are short lived, with frequent changes in membership (Akgun & Lynn, 2002; Levine, Choi, & Moreland, 2003; Moreland & Agote). Although the benefits of stable membership for teamwork processes and performance are certainly acknowledged (e.g. van Woerkom & Croon, 2009), it is argued that membership stability per se does not necessarily define real teams in today's organisations. Although changing membership will alter aspects of the team composition, the fundamental structure, objectives and processes of the team will remain less effected and will instead evolve as a team level property over time. Therefore, although team members may come and go, and will inevitably have some impact on composition and process characteristics, the extent to which the team as a whole is underpinned by a collective social identity, interdependence and a degree of self-regulation will emerge as a collective and more stable team level property. As is discussed in great detail in chapter 4, what is more crucial for defining real teams is that a team is bounded within its context, and is therefore recognised as a team, and has clarity over team membership. Based on these arguments, the conceptualisation of real teams presented here has sought to amend, extend and validate Hackman's existing definition.

Another important point to make with regards to theoretical implications for team effectiveness is that team realness will not necessarily lead to team performance, despite the encouraging results presented in validation study 7. Following the team effectiveness model presented earlier in this section (Hackman, 2002; Wageman et al., 2005), it is proposed that a degree of team realness is a prerequisite for effective teamwork, and can therefore be seen as an 'enabling condition'. Indeed, Hackman (2002) argued that real teams create a solid foundation for building effective teamwork. He noted that *'if the foundation is well conceived and solid, the builder can proceed to erect the rest of the structure with confidence. If it is not, the building will never be as sturdy as it could have been'* (Hackman, 2002, p.60). Therefore, if teams are more pseudo-like in nature (i.e. they lie at the bottom of the real team continuum), it is less likely they will be effective, although this will not always be the case. The characteristics which define real teams should trigger collaborative and cooperative teamwork behaviours. However, the effectiveness of these teamwork behaviours will depend partly of what is most appropriate for successfully achieving a specific team task. For example, an R&D team whose task is to come up with a new advertising campaign will

benefit mostly (in terms of team performance outcomes) from teamwork behaviours which stimulate creativity and innovation (e.g. constructive controversy; Tjosvold, 1998). Conversely, a healthcare team whose performance will largely depend on the minimisation of errors and incidents will benefit far more from teamwork behaviours which foster high levels of psychological safety (e.g. learning behaviours; Edmondson, 1999). The specific performance requirements of a team's task will therefore play a key role in determining what 'team effectiveness' looks like for a particular team and therefore which teamwork behaviours are most appropriate, beyond the most fundamental aspects captured by the real team construct.

Further, based on Hackman's (2002) reasoning, the organisational context within which a team is embedded has the substantial power to hinder the performance of an otherwise well-functioning team. Organisational context refers to a set of '*overarching structure and systems external to the team that facilitate or inhibit its work*' (Denison, Hart, & Kahn, 1996; p.1006) and appears as the fourth enabling condition of team effectiveness in Hackman's model presented earlier. From this perspective, team processes have little leverage on ultimate performance, as performance is far more contingent on the context within which the team is embedded. Gully (2000; p.32) also recently concluded that '*organizational contexts can have a strong influence on the behavior and performance of the work team as an aggregate.*' A supportive organisation will manage teams 'as teams' as opposed to collections of individuals, and will provide expert coaching to develop and train teams (Hackman, 2002). Therefore, although teams can be responsible for the integrity of their own processes, and to some extent determine their own team realness, they will also need to be supported by an appropriate organisational infrastructure if they are to be high performing. This infrastructure should not only recognise the team as being a real team (thus increasing the team's perception of boundedness), and design the team task with the necessary autonomy and specified roles, but should also support the team in many other ways if the team is to be truly effective (Millward et al., 2010). This includes the provision of adequate material resources, giving constructive and timely feedback to trigger team self-regulation, and rewarding the team appropriately and provide regular training opportunities. Based on this discussion, it is arguable that factors relating to organisational context not only impact on outcomes related to team effectiveness, but will also have a direct impact on team realness, particularly with regards to the input variables of autonomy, boundedness and specified roles.

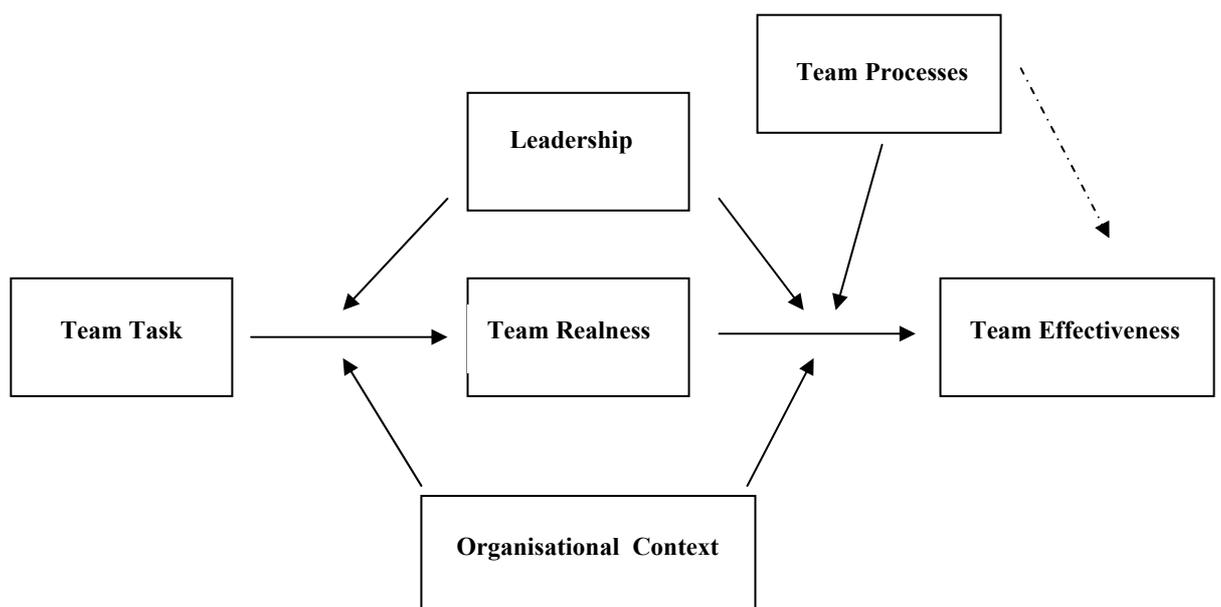
In integrating the real team construct with existing knowledge, the requirements of a team task should also be paid particular attention, given that in experimental social

psychological research the task is typically crucial for defining the team. As has already been discussed, the basic premise of teams is that they have the potential to achieve complex multi-faceted tasks that cannot be achieved by individuals alone. Therefore, an essential precondition for team realness is that the team task itself is sufficiently complex to require 'team work' (Hackman, 2002). The task should be designed in such a way that it requires team members to depend on one another's knowledge and actions and interact in a collaborative and integrated manner in order to optimal outcomes to be achieved. Therefore, the research presented here addresses an interesting theoretical question; are teams solely defined by their tasks or are they also defined by their structure and processes? Similarly, one might ask whether pseudo-like teams (i.e. teams at the bottom of the real team continuum) are just teams without team tasks. Indeed, it could be the case that some teams lie at the bottom of the real team continuum simply because they do not have a task which requires teamwork, and therefore their work design does not provide an opportunity to develop shared objectives and work interdependently, for example. In such cases, a team can only move up the continuum if their task is restructured in a way whereby it requires collaborative and interdependent action. If it is not possible to design the task in this way, then it is unlikely that a team is needed in the first place. However, another possibility is that teams which lie near/at the bottom of the real team continuum may already have a task which requires teamwork, but simply do not recognise the need to approach the task as a team. It is for these latter groups that the real team construct could be most useful in development terms (see section 8.3.3). Therefore, when faced with teams which report low levels of team realness, future research might look more closely at the team task itself using team task analysis techniques for example (e.g. Arthur et al., 2005; Baker, Salas, & Cannon-Bowers, 1998). This would allow for a further insight into the nature of task interdependence, structural autonomy and the workflow of a team's task to rule out the possibility that the task itself does not allow a real team to exist (beyond being a team by name only). Overall, organisational context and task requirements are both highly relevant variables which contribute to our broader understanding of team realness and how it is linked with outcomes. However, in proposing a global and generalisable definition of real teams, it is argued that regardless of such contingency factors, all work teams in organisations will conform to this definition to greater or lesser extents, and the scale presented in this thesis provides a practical means of applying this concept.

Overall, based on the substantial effects that factors relating to a team's given task, and the organisational context within which it is embedded can have on the six sub-dimensions of real teams, it is argued that team realness alone will not always be sufficient for predicting team effectiveness. In line with Hackman's recent model discussed earlier, the real

team construct should therefore be viewed as a *necessary but not sufficient* condition for team effectiveness. Indeed, a whole host of other factors will partly determine to what extent a team is able to work effectively in order to perform to an expected level. As well as the necessity of having a task designed for a team and a supportive organisational context for team-based working, leadership will also impact on the degree to which a team is able to operate as a real team, and in turn, be considered as effective. Indeed, the role that leaders occupy in developing adaptive effective teams has gained increasing amounts of interest in the recent literature, with person-focused and empowerment behaviours from leaders consistently predicting team productivity, team learning and team effectiveness (see Burke et al. 2006 for a meta-analysis). Further, a wide array of specific team processes and emergent states, such as communication, conflict management, potency, social support, psychological engagement, motivation and affect management (see Marks et al. 2001 for a review) will also all impact on the relationship between team realness and team effectiveness. For example, when there is a high performance goal-orientation in a team, the relationship between team realness and team effectiveness is likely to be strengthened. This is because such a team is not only highly characterised by the six real-team sub-dimensions, meaning that its structure and processes are appropriate for fostering synergy and enabling effective teamwork, but the team is also driven by a strong underlying motivation to achieve its objectives, thus exerting more effort towards high performance. Based on these various contingency factors, a new model which integrates the real team construct into a model of team effectiveness can be proposed (see Figure 8.1)

**Figure 8.1: An integrated model of team effectiveness**



The newly established real team construct has important implications for existing models of team effectiveness which have typically failed to explicitly acknowledge how they define real teams in the first place. As has already been discussed earlier in this section, I propose that most of the research reported in the organisational psychology team literature focuses narrowly on relationships between very specific and bounded team process and outcomes relating to team effectiveness. With regards to figure 8.1, this trend is captured on the right hand side of the model, by the dotted line between team processes and team effectiveness. Over and over team researchers choose to focus their research in this part of the model, often finding inconsistent results based on the same variables (see chapter 2 for a discussion). Very often, recent models in the literature incorporate specific inputs, emergent states, or other team processes as moderators and mediators in complex multi-level and longitudinal designs. The mass of research evidence that has been generated here over recent decades has been very fruitful in terms of developing a comprehensive and rigorous knowledge base about the effects that specific aspects of teamwork can have on outcomes.

However, I propose that there is one fundamental flaw that has failed to be addressed in most existing theoretical and empirical research on teams. That is, if we are theorising about work teams, then we should ensure that we are actually studying real work teams in the first place, and explicitly acknowledge the fundamental characteristics of real teams in future models of team effectiveness, rather than simply leaving them to be assumed. Failing to account for such fundamental assumptions means that all of our findings about the relationships between team processes and outcomes reported in the literature are potentially inaccurate. As a result, postulations from many existing models of team effectiveness can be applied interchangeably to any sort of collective in the workplace, with the assumption that such hypotheses should hold, regardless of whether the team at hand is a real team, a pseudo team, or a simple collection of individuals who have nothing in common other than their physical proximity. However, the new model presented here takes explicit account of what characterises the subject of our interest, which may help to explain, why certain relationships between team processes and team effectiveness are found, and others are not. For example, referring back to a piece of research evidence presented in chapter 2, the reason why Cappelli and Neumark (2001) found that teamwork had no effect on overall labour efficiency, could have been because the teams that they studied were all low on the real team continuum, and exhibited pseudo-like characteristics. They may not have had a shared goal, specified roles and/or a degree of autonomy to determine their work, for example, meaning that the relationship which the researchers were actually observing was between pseudo-like teamwork and efficiency. Thus, accounting for the characteristics of real teams in models of

team effectiveness will allow team scholars to more fully understand what sort of work units they are studying and therefore more accurately interpret the empirical results they find. Indeed, given the powerful impact that team realness will have on team effectiveness, the real team concept will be most valuable for team scholars conducting quantitative studies on team structure, processes and context, and the impact these have on relevant outcomes. Incorporating this powerful overarching construct into future research could well lead to stronger relationships being established between team inputs, processes and outputs, by removing the effects of pseudo-like teams. However, if much of what we already know from the literature is based on research with pseudo teams and such like, the incorporation of team realness into our models could also lead to the weakening of the research evidence. Only future research in this area will tell.

Returning back to the original discussion regarding team effectiveness, a further reason why team realness might not always predict team performance is based on findings from research that has focused more closely on some of the individual sub-dimensions which comprise the real team model. For example, Stewart and Barrick (2000) found a curvilinear relationship between team interdependence and team performance. Specifically, for teams engaged in conceptual tasks, a U-shaped relationship was found. The authors argued that this was because moderate interdependence fails to optimise either individual work or group work. Conversely, for teams engaged in behavioural tasks, a  $\cap$ -shaped relationship was found. Similarly, Wageman (1995) also argued that either too much or too little interdependence will undermine team effectiveness. Low interdependence will minimise team member interaction to the extent that collective norms and shared objectives do not develop, and shared learning is therefore prevented (Johnson & Johnson, 1989). Conversely, if interdependence is too high, levels of coordination might be so elevated that too much energy is channelled into maintaining coordination and regulating behaviour, which could have otherwise been spent on task performance. Similar results were also reported by Saavedra et al., (1993). Therefore, the costs of interdependence can sometimes outweigh the benefits (Wageman, 1995). With regards to team autonomy, although no empirical evidence exists to show that high autonomy is detrimental for team performance, some team scholars have argued that high autonomy may not be beneficial for teams performing clearly understood and optimised tasks (Manz & Stewart, 1997), and that high autonomy will be more beneficial for teams operating under uncertain and dynamic task conditions (Stewart, 2006). Finally, research into team boundedness has also suggested that if team boundaries are too strong, the team can become impermeable and may be seen by others as ‘*something of an island unto itself*’ (Hackman & Edmondson, 2007; p. 29). The team might therefore become isolated and

lose touch with other teams, managers or customers (Aldefer, 1987). As a result, team boundary spanning behaviours, which have been shown to positively impact team performance (Drach-Zahavy, 2010), may be restricted. Finally, research into team reflexivity has shown that high levels of reflexivity more strongly predict performance at the implementation phase of a team task (Gevers, van Eerde & Rutte, 2001), suggesting that persistently high levels of reflexivity may not be advantageous. This research evidence all serves to suggest that higher scores on the real team scale may not necessarily be better in terms of team performance outcomes. Having said that, it should be kept in mind that the aim of this research endeavour was to revisit, define and operationalise what a real team is; and not to develop yet another measure of team effectiveness. Further, detrimental effects of very high or very low scores are only likely to occur at the extreme ends of the real team continuum, and will therefore be rare.

### **8.3.2 Methodological contributions**

The availability of a short, parsimonious and validated measure of team realness has important implications for research design and methodology in the field. As was discussed at length in chapter 4, when researchers approach team samples to participate in their study, there is typically very little quality control or inclusion criteria put in place with regards to selecting teams for inclusion. Given that the term ‘team’ is so widely applied with seemingly indiscriminate use in organisations (Learmonth, 2009), researchers are often faced with a great degree of ambiguity in determining what represents the subject of their interest (Hitt et al., 2007). I argue that being a team by name only is surely not enough to warrant inclusion, especially given the results presented in chapter 3 of this thesis. Indeed, some researchers make efforts to measure certain team characteristics such as interdependence (e.g. Schippers, Hartog, & Koopman, 2007) or boundedness (e.g. van Woerkom & Croon, 2009) during data collection. However, in isolation these constructs do not capture the full extent of what is traditionally defined as a team (see table 4.1, chapter 4). Other researchers specify a list of inclusion criteria in an effort to control the quality of their sample at the point of recruitment (e.g. Brav, Andersson & Lantz, 2009). However, here again researchers are ultimately left to make their own subjective judgement as to whether these criteria are met or not, often relying on their own limited observations of the teams at hand, or by asking opinions of organisational members who also bring their own subjective perceptions to the table. Although these efforts are superior to simply recruiting any group or collective which calls itself a team, I have proposed that a more scientific and rigorous approach is necessary in order to bring clarity and coherence to our research findings on teams in organisations.

The real team scale proposed in this thesis offers team researchers with a validated measure which can inform them about the fundamental structure and processes of the teams they choose to study, and to what extent these conform to the theoretical definition of a real team. The short twelve-item scale can either be administered prior to or in combination with the larger team member questionnaire. At the very least, the construct of team realness could be controlled for in a researcher's analysis, in order to rule out any effects that it might have in explaining the variance in the dependent variable(s). Incorporating a measure of team realness could also help to further explain the relationships found in a dataset by treating it as a moderating or mediating variable in a larger theoretical model. For example, the relationship between team-based human resource practices and team performance might be moderated by the realness of a team. Researchers might also wish to create categorical variables based on the team realness scores, and explore more closely those teams which fall into the upper quartile for example. Alternatively, they may wish to omit cases in the lowest quartile from the analysis to ensure that they are not drawing important conclusions in their research based on data from pseudo-like teams. Overall, the availability of the real team scale provides team researchers with a new methodological choice with regards to identifying samples of teams for study, as well as accounting for the fundamental characteristics of a work team in their analysis. The consideration of this important variable will ensure that the conclusions drawn from our research are accurate, and will not be confounded by the possibility that the collectives which we have studied are simply not real teams at all.

### **8.3.3 Practical contributions**

The construction of the real team scale has various implications for informing organisational practice. Given its diagnostic nature, teams in organisations could learn a lot about their basic structure and processes by completing the scale and receiving feedback. Given its continuous nature, the construct provides a developmental tool that could be used across a large sample of teams to gain an overall picture of the state of team working within a particular organisation. An occupational psychologist or other relevant expert could then provide specific advice on how each of the sub-dimensions could be improved upon. Examples of such feedback are provided in the team reports that were generated for participating teams from the organisational sample (see Appendix B.9). Here, the real team sub-dimensions were reported on individually, helping teams to identify specific areas where they could improve.

This continuous perspective of the new construct is also very useful for developmental purposes. If a team perceives that it is possible that they can progress up the real team continuum, then they are more likely to put in some hard work at improving their team processes and structure, than if they are assigned to a particular category based on the typological approach presented in chapter 3. Indeed, this approach over-simplifies the complex nature of ‘team realness’ and does not capture the subtle differences or variations of each of the real team criteria for any particular team. It also compartmentalises teams, labelling them with absolute states (real team or pseudo team) thus making strong diagnoses. This could lead to various problems. For example, those labelled as ‘real teams’ could become complacent assuming that they will therefore always be effective; meaning that team members may fail to explore ways of improving their current state. On the other hand, ‘pseudo teams’ are likely to feel discouraged, especially if they are labelled as poor performers, which could have a profound impact on their team potency. Such labels could also trigger team conflict or a climate of blame within the team. However, by understanding the structure and processes define real teams, organisations can develop human-resource management (HRM) practices which facilitate the development of real teams such as ensuring that team tasks are appropriate, allocating sufficient autonomy to teams and providing appraisal and performance management practices which focus on shared team objectives. This research also highlights that organisations should provide adequate time and resources needed for teams to actively take time to engage in reflexivity. Indeed, research has shown that leaders can craft contexts that can facilitate and sustain effective self-regulation (Cohen, Chang, & Ledford, 1997; Kerr, Hill, & Broeding, 1986), meaning that organisations could recruit and develop leaders who display such competencies.

The real team construct has useful, practical implications for organisational development, particularly given its short and straightforward design. The small item pool allows for a convenient and unobtrusive data collection process, which would be highly appealing to managers who do not want their staff spending too much time completing a questionnaire. Given its size and simplicity, it is likely that respondents would be very willing to complete the real team scale on a multiple number of occasions without becoming fatigued, thus enabling researchers to gather highly reliable repeated measures of team realness in a longitudinal design. For example, the real team scale is currently being distributed to approximately 250 teams over three time points over the course of an organisational restructure of a large healthcare organisation. Stakeholders within this organisation expressed their preference towards the real team scale over other available questionnaire tools, given its ease in distribution and speed in completion. Therefore, the imperative for the new scale to be

short and parsimonious is likely to pay-off in terms of gaining interest from organisations to employ the tool for organisational development purposes. Further, as more data is collected from a larger number of work teams in a variety of organisational contexts, the construct will not only be tested further for its generalisability and psychometric properties, but there will also be a larger set of norm data available, against which participating teams can be compared on the basis of their scale scores.

One wider practical implication that prompted the need for this research in the first place is the over-use of the term '*team*' in organisations. In organisational discourse, this term has powerful and loaded implications, particularly with regards to performance expectations. Based on the results from chapter 3, it is clear that the existence of 'teams' is by no means a panacea for individual or organisational effectiveness. In fact, results suggest that healthcare managers in particular should use the term 'team' far more selectively if they want to reap the benefits of effective teamwork. Findings from this thesis suggest that organisations should become more informed and responsible when designing their team-based structures and assigning team labels, ensuring that the teams which are set-up have the opportunity and scope to achieve high levels of realness. Leaders and managers must think carefully as to whether the structure and culture of their organisation, as well as the tasks to be carried out, actually facilitate and support the development of real teams. For example, if there is a strong hierarchical structure with a top-heavy distribution of autonomy, then is it unlikely that real teams will develop and prosper, particularly at lower levels of the organisation. Similarly, if the task to be completed is simple, clearly understood and is to be conducted in a predictable environment, it is unlikely that teams are even needed in the first place. In fact, the implementation of teams in such an environment could actually hamper overall performance, due to the immanent processes losses inherent in coordinating a group of individuals (Hackman, 2002). Therefore, it is the responsibility of both researchers and organisations to ensure that the work teams of the future do not mimic the pseudo-type teams we so often come across in today's organisations and further exacerbate the debates around '*the romance of teams*' (Allen & Hecht, 2004), the '*tyranny of a team ideology*' (Sinclair, 1992), and the '*team halo effect*' (Naquin & Tynan, 2003). As was discussed in chapter 2, research evidence to date shows that teams can have positive impacts on outcomes for individuals and organisations; the real team scale provides us with a means of bringing clarity and precision to our measurement of teams, which should in turn, bring coherence and validity to our research findings and practical interventions.

## 8.4 LIMITATIONS

As with all pieces of research, there are a number of limitations and caveats relating to the results presented in this thesis that should be acknowledged. Specific limitations with regards to each on the studies were discussed in more detail at the end of the respective sections throughout chapters 3, 6 and 7, and will therefore not be repeated here. However, there are a number of broader limitations that apply across the studies which shall now be outlined.

The first relates to boundary conditions of this research with regards to the nature of the three samples of data. Although sample 2 comprised teams from a real organisational setting, results from samples 1 and 3 should be interpreted with a degree of caution. Limitations relating to student samples have been acknowledged throughout this thesis. Despite that fact that in both the undergraduate and postgraduate student samples, team performance had meaningful and personal implications for team members, the artificial nature of these teams and their tasks cannot be ignored. As many of the participants in sample 3 were MBA students, and therefore had significantly more work experience than participants in the undergraduate student sample, it is arguable that teams in sample 3 more closely resembled real-life work teams. However, given that members of the teams in both samples 1 and 3 lacked history with one another, and were only assigned to work on one overall task together, they were most likely to constitute project teams according to Sundstrom's (1999) classification of team types. The more prolonged and episodic nature of the business game task in sample 1 meant that the undergraduate teams had to make a series of realistic business decisions over the course of the simulation, and therefore also had features of managerial and action teams (Sundstrom, 1999). Overall however, given the artificial context of the team tasks, as well as the limited representation of team types, the generalisability of the results from these student samples remains somewhat limited. More weight may therefore be given to findings from the organisational teams in sample 2 given that the stakes are simply higher for real working professionals who stand to lose their jobs if their team does not perform (Van der Vegt, Bunderson & Oosterhof, 2006). However, it is also recognised that no study is completely generalisable (Mook, 1983).

Some specific limitations should also be acknowledged with regards to the organisational sample. Firstly, by only collecting data from teams in only one organisation, it is recognised that this may have restricted the range of variability in the key constructs of interest. However, gathering data from just one organisational context could also be seen as

strength of the findings from sample 2, as this may have eliminated a number of other explanations for the performance effects reported in validation study 7. Two further limitations should also be noted in relation to sample 2. Firstly, with regards to the approach used for recruiting teams for the study, the self-selection nature of this recruitment may have resulted in a biased sample, whereby only teams which already felt that they were well-functioning and/or had a learning orientation may have opted to take part in the study. However, those who initially expressed interest but subsequently did not take part mostly dropped out due to time constraints or pressing organisational tasks. Further, given that the sample still displayed sufficient variation in team realness, it is unlikely that such biases were operative in this respect. However, there is still the possibility that the data might not have truly represented all types of team with regards to the team typologies discussed earlier. Secondly, it must be considered that the feedback reports provided to the teams shortly after the completion of the team member questionnaire could have acted as an unintended intervention, which may have influenced the way the team subsequently functioned, and in turn, the way in which they were rated on their performance and productivity at time 2. However, the majority of the teams only received their feedback reports two weeks prior to the second team ratings, and it is therefore unlikely that their structure and processes had undergone any significant change before the second ratings occurred.

With regards to establishing causality between team realness and performance, data on dependent variables relating to team performance were consistently collected from sources other than team members themselves, thus reducing the threat of common method bias. However, with regards to sample 2, it is recognised that the team manager ratings of team performance and productivity might not reflect actual performance and productivity. The time lag between the two measurements of these ratings (four months) was also selected for practical convenience and had no sound justification. Indeed, there is no existing theoretical or empirical evidence available to provide an adequate approximation of an appropriate time lag between measurements for capturing casual relationships (Chan, 1998). However, given that similar predictive relationships between team realness and team outcomes were found using a variety of the different methods for measuring the dependent variables (namely objective financial data, manager ratings and assignment scores), initial findings are certainly encouraging.

In relation to team type representation, another potential limitation pertains to the fact that no private sector teams were included in the research. The real team scale must therefore be validated in a private sector context, as well as in a number of different organisational

types before firm conclusions about generalisability can be confirmed. The application of the scale to NHS healthcare teams would be particularly useful to compare trends with those from chapter 3. Validation in a variety of national contexts would also be beneficial, given that the current research was conducted solely in the UK.

Methodologically, issues also remain on how to best aggregate data to accurately capture shared team level perceptions. Although this research followed the commonly adopted aggregation method, whereby individual ratings were used to compute team-level measures of team realness, increasing evidence suggests that consensus ratings provide incremental validity over the aggregation method (Gibson, Randel, & Earley, 2000; Kirkman, Tesluk, & Rosen, 2001). The consensus method could therefore also be used in future research. Indeed, it would be useful to understand more about how, why and when aggregated and consensus ratings on the real team scale provide similar or different results.

Finally, it is recognised that the sample size in each of the datasets ( $N = 54, 63$  and  $52$  respectively), although reasonable enough for team-level research, may have reduced the statistical power for hypotheses testing. Unfortunately however, this is a common problem faced by most researchers exploring team-level phenomena.

## **8.5 FUTURE RESEARCH**

Given that the development of this new and extended construct of real teams is still in its early stages, there are many avenues for future research. Therefore, the most pressing areas for future research endeavour will now be outlined.

Firstly, future research should aim to validate the scale across various different team types. Many team type taxonomies have been advanced in the literature over recent years (e.g. Cohen & Bailey, 1997; Devine, 2002; Sundstrom, 1999; Sundstrom et al., 1990). Based on the work of Sundstrom et al. (2000), a commonly adopted team typology consists of three types of team; decision-making teams, action teams and project teams. According to these definitions, project teams are typically involved in both behavioural action and informational-knowledge work. Conversely, action teams tend to carry out time-sensitive tasks which require highly coordinated actions. Such teams include those which perform physical tasks such as manufacturing or surgical teams. Finally, decision-making teams typically perform more conceptual tasks which involve processing and analysing information to make decisions

(DeChurch & Mesmer-Magnus, 2010). In proposing a nomological and generalisable construct of real teams, it is important that the new scale is validated across these different team types. Project teams were most certainly represented by the teams in samples 1 and 3 of this research. However, the types of team in sample 2 were less clear, despite the inclusion of a measure of ‘task type’ (from Stewart & Barrick, 2000) in the team member questionnaire. Following McGrath (1984), this question required respondents to rate the amount of time they spent working on four types of tasks (*generating ideas and plans, choosing between alternatives, negotiating conflicts and executing work*) with the total time adding up to 100%. Stewart and Barrick (2000) used the percentage allocated to the ‘executing work’ category as an indicator of task type, with higher values indicating more behavioural (rather than conceptual) tasks. However, the poor design and layout of this question meant that many respondents in sample 2 did not answer it correctly. Further, where it was answered correctly, poor intra-class correlations meant that the data could not be justifiably aggregated to the team level. Therefore, this variable could not be included in the analysis. Although it is likely that the sample 2 data represented all three types of team outlined above, the data could not confirm this and therefore no empirical testing could be carried out to explore relationships between team type and team realness. Therefore, future research should seek to more explicitly validate the new scale with different team types to ensure that the construct is generalisable to all types of work teams in organisations.

Another interesting area for future research would be to explore the validity of the real team scale with top management teams (Hambrick & Mason, 1984) given the more strategic nature of their work, to see if a similar second-order factor structure is found. Further, given recent advances in information technology and communication, the upsurge of virtual teams also provides a further opportunity to explore the applicability of the real team construct to different types of teams. Virtual teams are defined as groups whose members have unique skills, who are situated in distant locations and who must collaborate using technology across time and space to accomplish their tasks (Lipnack & Stamps, 2000). The minimal face-to-face interaction inherent in such teams may have important content validity implications for the real team construct proposed here. Indeed the ‘virtuality’ of such teams has shown to impact on extrinsic motivation (Kayworth & Leidner, 2001) as well as to exacerbate performance problems and process losses (Gibson & Cohen 2003; Lipnack & Stamps, 2000). However, more specifically, the reduced physical contact of virtual team can hinder the development of a collective team identity (Mannix, Griffith & Neale; Foil & O’Conner, 2005) and therefore has direct implications for the sub-dimensions of boundedness and specified roles.

Evidence suggests that role allocation in virtual teams is typically more ambiguous. Because there tends to be a lack of clear areas of responsibility, virtual team members often have more of a need for role definition (Kayworth & Leidner, 2002; Lipnack & Stamps, 2000). This can prompt members of such teams to claim their own specified roles more stringently, making the development of a team identity even more tenuous (Wilson, George, Wellins & Byham, 1994). With regards to boundedness, Weisenfeld, Raghuram, and Garud (2002) argue that virtual interactions reduce the emphasis on tangible, visible dimensions that distinguish groups (namely collocation of members), and instead require a collective perception of 'belonging'. However, in developing a shared social identity, labels of team boundaries which are very often assigned from an external position in higher authority are very often most defining (Ashforth & Humphrey, 1995). The perceived legitimacy and visibility with which these labels are conferred on the team serve to increase the salience of team identification. Therefore, given that perceived visibility and legitimacy in virtual teams is typically much lower than in traditional face-to-face teams (Foil & O'Conner, 2005), the sub-dimension of boundedness may also behave differently in a second-order model for virtual teams. Overall this suggests that the application of the new measure to virtual teams is an important avenue for future research. Furthermore, as has already been discussed, the scale would benefit from being validated in other organisational settings, particularly in the private sector. This should include the application of the scale to teams from non-western contexts to further enhance its generalisability. Indeed, it cannot be assumed that theories developed in one culture are as equally applicable in another (Hofstede, 1993).

The discriminant validity of the real team scale also requires further attention, given the multicollinearity effects reported in validation study 7. Future studies should incorporate the new scale alongside Hackman's original real team scale to ensure that this updated and extended version can explain a larger proportion of the variance in related outcome measures such as team performance. Further, the new scale should be analysed alongside other related constructs that form part of the nomological network of relations. These constructs might include team processes or emergent psychological states such as team affective climate (González-Roma, Peiró, Subirats, & Mañas, 2000), team attachment, feedback seeking behaviour or team-member exchange (Seers, Petty, & Cashman, 1995). This would enable the nomological validity of the construct to be explored; an area that was not directly addressed in the current research.

Given the increasing amount of attention being paid to temporal considerations in team research (Gully, 2000; Kozlowski & Bell, 2003; Marks et al., 2001), the stability of the

real team construct over time should also be investigated. Although the test re-test reliability of the scale demonstrated adequate results in this research, the three phases of data were collected in a very short time frame from student project teams which only came together to work on one task. Future research should aim to use a longitudinal research design which spans over a longer time period using permanent organisational teams. Therefore, the stability of the real team construct over a number of team tasks and/or over a team's entire lifecycle could be explored. Feedback loops from outputs to processes which have emerged in many recent team effectiveness models (e.g. Ilgen et al., 2005; Marks et al., 2001) could also provide a basis for theorising about the cyclical or episodic relationships between team realness and other team processes and outcomes.

Finally, given the quantitative focus of the research so far, qualitative work might be conducted to explore the barriers and facilitators to team realness, in an effort to provide organisation with more practical guidance on how to create an organisational climate that enables real teams to develop and prosper. After administering the real team scale, teams at both the top and bottom end of the continuum could be approached for in-depth interview and observational studies to explore the richer underlying reasons behind their scores. In such cases, it would be important that the interviewer is not informed of which teams were high and which were low on the real team scale to ensure that their interpretation of the data is not biased. Once a larger sample of norm data is accumulated, leaders in organisations which exhibit high levels of team realness could also be interviewed to gain an insight into the aspects of organisational culture, leadership style and HRM practices that facilitate the growth of real teams. Overall, qualitative research into the construct of real teams could offer fruitful avenues for developing our understanding of how, when and why teams exhibit high levels of realness.

## 8.6 CONCLUSION

A recent paper by Offermann and Spiros (2001) calls for "*future researchers to describe the 'teams' in their samples in considerably more detail*" (p.387). It is therefore hoped that the short, validated and theory driven measure for team realness proposed in this thesis will help team researchers in this challenging and complex endeavour. Although the establishment of the real team construct is still at the early stages, among its strengths are the acceptable to very good psychometric properties across three samples of data, its convergent and concurrent validity based on results from data triangulation, as well as its adequate demarcation from the

related construct of team satisfaction. Encouraging results with regards to the predictive validity of the construct were also established. In conclusion, it is hoped that researchers consider this new scale to be a useful addition to their toolbox for conducting team research, and that its application will put us in better a position to coherently accumulate our vast understandings about the nature of teams in organisations.

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## Appendices

### APPENDIX A:

**Table A.1: Age range, team-based working and safety at work**

	Aged 16-30	Aged 31-40	Aged 41-50	Aged 51 plus	F
% of staff in sample	16.4	24.5	31.3	26.2	
% of staff working in a 'real team'	54.4	53.8	53.7	49.7	66.81***
% of staff experiencing harassment, bullying and abuse from patients	31.0	28.9	27.1	22.2	100.92***
% of staff experiencing harassment, bullying and abuse from colleagues	16.7	18.4	18.6	16.4	13.30***
% of staff experiencing physical violence from patients	0.9	1.4	1.1	1.2	174.57***
% of staff experiencing physical violence from colleagues	16.0	13.5	10.7	7.6	5.08**
% of staff witnessing errors, incidents and near misses	49.3	43.5	40.7	31.3	322.85***
% of staff suffering work-related stress	29.7	30.9	33.3	32.5	17.34***
% of staff suffering work-related injuries	23.7	17.9	17.6	17.4	69.66***

†  $p \leq .10$  \* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

**Table A.2: Gender, ethnic background, team-based working and safety at work**

	Male	Female	F	White	BME	F
% of staff in sample	19.3	78.8		84.4	13.7	
% of staff working in a 'real team'	53.2	52.0	37.717***	51.5	56.9	47.44***
% of staff experiencing harassment, bullying and abuse from patients	20.7	28.4	1418.187***	27.0	25.9	19.20***
% of staff experiencing harassment, bullying and abuse from colleagues	18.1	21.9	0.039	16.9	21.8	420.78***
% of staff experiencing physical violence from patients	10.1	11.8	123.676***	11.5	11.6	0.81
% of staff experiencing physical violence from colleagues	1.9	1.0	277.210***	0.9	3.1	1216.41***
% of staff witnessing errors, incidents and near misses	45.4	39.1	393.529***	40.3	39.8	3.10
% of staff suffering work-related stress	28.8	32.7	304.116***	31.8	32.3	4.32**
% of staff suffering work-related injuries	18.4	18.8	4.095**	18.1	21.9	248.68***

†  $p \leq .10$  \* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

**Table A.3: Tenure, team-based working and safety at work**

	Less than 1 year	1-2 years	3-5 years	6-10 years	11-15 years	15+ years	F
% of staff in sample	6.8	13.9	23.0	19.3	11.0	24.9	
% of staff working in a 'real team'	54.8	53.3	51.3	50.7	51.2	53.5	8.73***
% of staff experiencing harassment, bullying and abuse from patients	20.9	24.0	27.4	28.9	27.6	27.9	29.60***
% of staff experiencing harassment, bullying and abuse from colleagues	14.3	17.3	19.0	18.6	17.6	16.8	4.60***
% of staff experiencing physical violence from patients	9.0	11.5	12.6	12.2	11.1	10.7	11.94***
% of staff experiencing physical violence from colleagues	0.9	1.2	1.5	1.3	1.0	1.0	4.60***
% of staff witnessing errors, incidents and near misses	40.6	40.2	40.3	41.5	39.7	39.6	2.25**
% of staff suffering work-related stress	19.9	27.6	31.4	33.9	33.5	35.8	99.05***
% of staff suffering work-related injuries	16.6	20.9	20.6	19.5	17.0	16.2	30.72***

†  $p \leq .10$  \* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .00$

**Table A.4: Occupational group, team-based working and safety at work**

	Admin & Clerical	AHPs	Medical	Central functions	Ancillary	Nursing	Social care	Ambulance	General Mgt	Other	F
% of staff in sample	19.9	17.8	8.3	3.4	5.9	38.8	0	0.1	1.3	4.4	
% of staff working in a 'real team'	16.9	20.4	9.9	3.9	3.6	39.5	0	0	1.7	4.1	221.01***
% of staff experiencing harassment, bullying and abuse from patients	13.7	13.3	7.7	0.7	2.2	58.7	0	0.1	0.7	3.0	497.08***
% of staff experiencing harassment, bullying and abuse from colleagues	18.0	16.9	7.7	3.0	5.1	43.2	0	0.1	1.5	4.4	14.51***
% of staff experiencing physical violence from patients	2.6	9.2	5.0	0.1	2.3	76.6	0	0.1	3.0	3.5	610.46***
% of staff experiencing physical violence from colleagues	11.5	10.8	6.1	1.5	11.8	48.3	0	0.1	1.2	8.7	17.57***
% of staff witnessing errors, incidents and near misses	10.2	20.8	11.6	1.4	3.9	47.3	0	0.1	1.1	3.6	509.98***
% of staff suffering work-related stress	19.5	18.1	6.0	3.2	4.4	43.4	0	0.1	1.3	4.0	50.09***
% of staff suffering work-related injuries	13.9	17.4	7.0	1.2	7.3	47.7	0	0.1	0.3	5.1	108.14***

†  $p \leq .10$  \*  $p \leq .05$  \*  $p \leq .01$  \*\*\*  $p \leq .001$

**Table A.5: Trust region, team-based working and safety at work**

	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	South Central	F
% of staff in sample	5.5	11.6	15.3	15.4	15.0	8.0	12.5	10.3	6.4	
% of staff working in a 'real team'	5.2	11.8	15.8	15.3	15.0	7.9	12.5	10.0	6.4	3.82***
% of staff experiencing harassment, bullying and abuse from patients	5.4	11.8	15.9	15.5	14.6	7.8	12.5	10.8	5.7	4.24***
% of staff experiencing harassment, bullying and abuse from colleagues	4.9	11.3	17.2	14.6	14.8	8.3	12.5	10.3	6.1	6.63***
% of staff experiencing physical violence from patients	5.8	10.5	13.4	17.1	15.5	7.8	13.9	10.4	5.7	8.15***
% of staff experiencing physical violence from colleagues	3.6	9.5	25.9	10.4	11.0	10.3	9.5	11.8	8.0	12.56***
% of staff witnessing errors, incidents and near misses	5.7	11.9	15.6	14.7	14.9	7.6	12.9	10.5	6.2	4.53***
% of staff suffering work-related stress	5.6	11.1	16.0	15.4	15.1	7.7	12.4	10.6	6.1	3.41***
% of staff suffering work-related injuries	5.7	11.0	15.4	15.2	14.5	8.1	13.1	10.8	6.3	2.68**

†  $p \leq .10$  \*  $p \leq .05$  \*\*  $p \leq .01$  \*\*\*  $p \leq .001$

**Table A.6: Line management, disability, team-based working and safety at work**

	Line Manager	Non-line Manager	F	Disabled	Non-disabled	F
% of staff in sample	31.1	66.9		4.3	94.1	
% of staff working in a 'real team'	31.7	20.6	1153.63***	45.9	52.6	6.80***
% of staff experiencing harassment, bullying and abuse from patients	16.8	10.1	1237.21***	25.4	1.4	154.56***
% of staff experiencing harassment, bullying and abuse from colleagues	11.4	6.3	333.42***	16.3	1.3	772.60***
% of staff experiencing physical violence from patients	7.2	4.2	393.19***	10.9	0.6	71.02***
% of staff experiencing physical violence from colleagues	0.8	0.4	5.16**	1.1	0.1	245.22***
% of staff witnessing errors, incidents and near misses	24.4	16.0	1700.92***	38.3	2.0	63.31***
% of staff suffering work-related stress	20.4	11.6	876.31***	29.6	2.3	444.93***
% of staff suffering work-related injuries	13.5	5.1	562.35***	17.0	1.6	1232.25***

†  $p \leq .10$  \*  $p \leq .05$  \*\*  $p \leq .01$  \*\*\*  $p \leq .001$

**Table A.7: Working hours, shift working, team-based working and safety at work**

	Full time	Part time	F	Shifts	Non-shifts	F
% of staff in sample	74.1	24.5		49.9	48.5	
% of staff working in a 'real team'	40.4	11.9	149.84***	25.8	26.5	513.69***
% of staff experiencing harassment, bullying and abuse from patients	21.1	5.9	461.72***	8.7	18.2	11006.51***
% of staff experiencing harassment, bullying and abuse from colleagues	14.3	3.4	994.14***	7.9	9.9	523.61***
% of staff experiencing physical violence from patients	9.3	2.2	621.04***	1.4	10.1	25650.38***
% of staff experiencing physical violence from colleagues	21.1	5.9	159.03***	0.4	0.8	295.75***
% of staff witnessing errors, incidents and near misses	32.8	7.7	4302.30***	15.1	25.4	5451.15***
% of staff suffering work-related stress	25.5	6.4	1734.56***	14.7	17.2	476.25***
% of staff suffering work-related injuries	14.7	4.0	389.29***	11.9	6.7	4160.55***

†  $p \leq .10$  \*  $p \leq .05$  \*\*  $p \leq .01$  \*\*\*  $p \leq .001$

## APPENDIX B:

### Appendix B.1: Email invitation (sample 1)

Dear Student,

I would like to invite you to fill out a short survey on your experiences of team working in the Business game module (BS2225), which will take no more than 5 minutes. The purpose of the research is to develop a new tool to measure teamwork interactions.

By completing the survey, you will be automatically entered into a **free prize draw** in which **2 new iPod Nanos and 3 new iPod Shuffles are on offer!**

If you would like to take part simply click on the link below and follow the instructions. Your participation would be greatly appreciated.

[www.bristolonlinequestionnaire.co.uk](http://www.bristolonlinequestionnaire.co.uk)

The prize draw will be held on 1<sup>st</sup> May 2008...Good Luck!

Best Wishes,

Joanne Richardson  
Doctoral Researcher  
Work and Organisational Psychology Group  
[richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk)

## Appendix B.2: Team member questionnaire (sample 1)



### Facilitating Collaboration within Teams

#### ***What is this survey and how long will it take?***

This is a survey for Business game students. It will take no longer than 10 minutes and by completing and returning it, you will be automatically entered into a free prize draw on 1st May 2008 in which a **Nintendo Wii and 2 iPod Nanos** are on offer...so don't miss out on your chance to win!

The survey is about your views on your work within your Business game team since the start of the module. It is not a test and there are no right or wrong answers. We want to know your personal views on the issues raised in the survey and what you think about the team you work in.

Participation in this study is entirely voluntary and will in no way influence your performance or mark on the Business game module (BS2225). There is no penalty for non-participation.

#### ***How do I fill in this survey?***

The questions in this survey relate to the team with whom you work in the Business game module. Please read each question carefully and give you immediate response by ticking the box which best matches your personal view, or by filling in the blank text box provided.

#### ***Who will see my answers?***

The information you provide is completely confidential. Your data will be stored on a secure electronic database to which no one other than the researcher will have access. Your answers will provide data for the PhD thesis of the researcher, Joanne Richardson, and anonymous aggregated results may be published in academic journals. Once the Business game module has finished, teams can request a team report. Please note that individual responses will not be identifiable and the report will simply summarise data for all team members, thus protecting your anonymity and confidentiality. These reports will not be distributed elsewhere.

If you agree to participate in this study, simply fill out your name or candidate number, together with your team name on the following page and complete the survey. Please also provide an e-mail address or telephone number so that the researcher can contact prize draw winners.

If you require any further information, please contact either Joanne Richardson at [richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk) or Professor Michael West at [m.a.west@aston.ac.uk](mailto:m.a.west@aston.ac.uk). Many thanks for your cooperation.

## Facilitating Collaboration within Teams Survey

<b>If you wish to participate in this survey, please fill in each box below</b>
Your <b>name</b> OR <b>candidate number</b> :
Your <b>Business game Team</b> name:
If you wish to enter the prize draw, a contact <b>telephone number</b> OR <b>e-mail address</b> :

### About your Team

To what extent do you agree or disagree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
In this team we know what we are trying to achieve	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Team members are committed to achieving the team's objectives	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We agree in the team about what our team objectives are	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
In this team we have a shared purpose	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We regularly discuss whether the team is working effectively together	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
The team often reviews its objectives	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We regularly reflect upon team performance and how it could be improved	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We have to coordinate our work tightly in this team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Members of my team have to communicate closely with each other to get the job done	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
The team task cannot be achieved without the contribution of every team member	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We decide as a team who will do what in the team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We are free to decide how to carry out the team's tasks	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
In this team we set our own goals	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
We are formally recognised as a team within our organisation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
It is clear who the members of our team are	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Members are clear about their own role within the team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Members are clear about the roles of other team members	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

### External Influence

	Always	Most of the time	Sometimes	Never	Don't know
How often do people outside of the team set your team objectives?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often do people outside of the team decide who will do what in the team?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
How often do people outside of the team decide how you will carry out team tasks?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

### Working with other team members

	None	One only	More than one	All
How many of the other members of your team do you have to regularly work closely with in order to complete your team task?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

	On an hourly basis	On a daily basis	On a weekly basis	On a monthly basis	On a yearly basis
How often do you have to work with other members of your team to complete the team's task?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

### Team Demographics

In the box below please indicate exactly how many members there are in your team	In the box below please indicate how many times your team meets in an average month

### Team resources

To what extent do you agree or disagree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The team has about the right number of people to do the task well.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
The team holds meetings regularly enough in order to do the task well.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

## Team Objectives

In the spaces below, please write down three of your team's main objectives
<b>Objective 1:</b>
<b>Objective 2:</b>
<b>Objective 3:</b>

Since the beginning of the Business game module...	Yes, a lot	Yes, a little	No	Don't know
Have the team's main objectives changed?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
Have the methods used by the team to get the job done changed?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

## Team Roles

In the space below, please write down what your key roles within the team are

--

In the space below, please write down the other key roles that members of your team perform

--

## Satisfaction with your team

To what extent do you agree or disagree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am pleased with the way my colleagues and I work together	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am very satisfied with working in this team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am satisfied with my present colleagues in my team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

## Team Potency

To what extent do you agree or disagree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
As a team, we believe in our ability to perform the team's task well	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Team members believe we can achieve the team's goals	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

## Team Identification

To what extent do you agree or disagree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I see myself as a member of my team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I am glad to be a member of my team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I feel strong ties with members of my team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
I identify with other members of my team	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

### END OF QUESTIONNAIRE.

Thank you for your time and effort in completing this questionnaire. It will form a valuable contribution towards our study on improving the effectiveness of work teams. Please feel free to contact the research team if you have any further questions

### **Appendix B.3: E-mail invitation (sample 2)**

*The following e-mail was sent to all staff in the sample 2 organisation:*

- \* If you are interested in receiving a quick and efficient 'health check' on the current effectiveness of your work team, then you are invited to take part in an organisation-wide research project, in collaboration with Aston Business School.
- \* All that is required is 15 minutes of your time – whenever and however it suites you!
- \* By taking part, you will receive a feedback report which is specifically tailored to your team, highlighting particular areas of current strength and excellence, as well as potential areas for development.
- \* Practical guidelines on how your team could improve its current processes and outcomes will also be provided.
- \* Please note that information you provide about your team is completely anonymous and confidential, and therefore (*name of organisation*) will not know who has taken part – or what the results of your team are.
- \* The feedback reports are for your team, and your team only.

If your team is interested to take part, please e-mail (*name of organisational contact*) by Friday 18<sup>th</sup> December.

## Facilitating Collaboration within Teams (Name of organisation)

### ***What's on offer?***

In collaboration with researchers at Aston Business School, the Organisational Development Department have a new opportunity on offer for teams working within (*name of organisation*). ***Facilitating Collaboration in Teams*** (FCIT) is a project which is designed to promote and instil the (*name of an organisational OD initiative*) principles and develop other important team processes within work teams (*name of organisation*). FCIT provides a quick and efficient 'health check' on the current effectiveness of your work team, providing you with specific and tailored feedback which will help you further improve you team processes and outcomes.

### ***Why should we be interested?***

Previous research has frequently shown that work teams which display a number of specific behaviours and practices (such as clear shared goals, reflexive thinking in team meetings, and autonomy in their work processes) demonstrate higher productivity and creativity and are generally comprised of more satisfied, motivated and committed team members. The FCIT survey is designed to probe these critical work practices and help to uncover areas of success, as well as areas for development in your current work team.

### ***What's involved?***

Participating teams will be asked to fill in a short 15 minute online or paper-based questionnaire (depending on practical arrangements made in your particular department). Middle management will also be asked to provide ratings of team effectiveness once at the beginning of the project and once three months later.

### ***What's in it for us?***

Based on staff members' opinions and views, the researcher at Aston would offer a single-team feedback report on request that mirrors your team's opinion about how well your team is currently working together. The report will highlight specific areas of strength and excellence in your team. Potential areas for development will also be suggested along with specific practical guidelines and suggestions on how your team could work towards achieving these.

Based on the findings, the researcher will also offer a written report of key results, including suggestions how to improve collaboration within teams, to the Head of Organisational Development. These results may provide a useful basis for training purposes, change management, quality improvement.

## ***What about Ethics?***

**The information you provide is completely confidential.** No one, other than the researcher will see your answers. In all reports provided at the end of the project, neither individual nor team responses will be identifiable and the report will simply summarise key trends in the data, thus protecting your **anonymity and confidentiality**. These reports will not be distributed elsewhere.

Participation in the research is entirely voluntary. You have the right to withdraw at any time without adverse consequences and (*name of organisation*) will not get informed of which team did or did not participate.

Your answers will provide data for the PhD thesis of the researcher, Joanne Richardson, and aggregated results may be published in academic journals with the organisations and participants involved kept anonymous. The research pursues no financial interests of any kind and the entire project will be supervised by Professor Michael West, Executive Dean of Aston Business School.

## ***If we would like to participate, what should we do next?***

Simply complete the **team data collection form** (attached) and return it directly to Joanne Richardson at Aston Business School. This information will enable us to efficiently handle the project. The form asks for:

### **(1) Your team's name**

(2) A **contact person** from within your team that would agree to act as a liaison for the researcher. This person's role would be to distribute the questionnaires and feedback reports to individual team members.

(3) Whether or not your team agrees that your team's line manager (or other relevant individual outside of your team) would be asked to provide ratings of your team's effectiveness.

(4) **Names of members of your team** (names will remain confidential and will be anonymised throughout the research process and in any correspondence/reports etc.).

Many thanks for taking time to consider this opportunity. Both Aston Business School and (*name of organisation*) would benefit greatly from your participation. We hope to receive a team data collection form from your team soon.

## ***Researcher Details***

Joanne Richardson  
Doctoral Researcher  
Work and Organisational Psychology Group  
Aston Business School  
Aston University  
Birmingham

Tel: 0121 2043316  
E-mail: richarj2@aston.ac.uk

Please do not hesitate to contact Joanne should you require any further information.

## Appendix B.5: Team data collection form (sample 2)



<b>Facilitating Collaboration in Teams</b> <b>Team Data Collection Form</b>	
1) Name of your team:	
<i>N.B. Should your team not have a formal name, please provide a suitable name or description that members of your team will recognise</i>	
2) Contact team member (please include address and e-mail/phone number)	
3) Effectiveness Rating: Does your team consent that the researcher asks a relevant manager to provide ratings of your team effectiveness?	
<i>Please circle/highlight respective answer</i>	
	<i>Yes</i> <i>No</i>
4) Names of you team members:	
1.	
2.	
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25.

Many thanks for your co-operation in completing this form. Please now return it to Joanne Richardson, the researcher leading this project at Aston Business School:

Via e-mail:

[richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk)

Or

Via post:

Joanne Richardson  
Work and Organisational Psychology Group  
8<sup>th</sup> Floor South Wing  
Aston University  
Birmingham  
B4 7EY

Joanne will be in touch with you shortly about how data collection with your team will proceed. If you have any questions before then, please contact Joanne via e-mail or telephone (0121 204 3316).

## Appendix B.6: Questionnaire invitation (sample 2)



*Participant name*  
*Participant address*

*Date*

Dear (*name*),

As I'm sure you are aware, the (*name of team*) has recently agreed to participate in the Facilitating Dream Teams Project, which is being conducted by Aston Business School. The information you provide will help to uncover to what extent your team is working as a real *dream team*, and how you might improve your team processes and effectiveness in the future.

In order to participate, you are invited to complete a confidential survey about your team which will take around 20 minutes. You will find the survey attached to this letter. Please complete the survey within two weeks of receiving this letter, and return it directly to me in the pre-paid envelope provided.

Once every team member has completed the survey, the team will receive a unique team feedback report which will contain details of key themes within the team, as well as suggestions of how to improve your team processes and team effectiveness. Your contribution is therefore highly valued. Please be assured that the feedback report your team will receive will provide team-level indicators of how you perceived yourself in each area; these scores will be an aggregate of your individual responses. Therefore, at no point will it be possible to tell how any one team member answered the survey, as the scores will all be averaged across the team. Please do not hesitate to contact me if you have any questions.

Many thanks for your participation.

Yours sincerely,

Joanne Richardson

Doctoral Researcher  
Work and Organisational Psychology Group  
Aston Business School  
Birmingham  
Tel: 0121 204 3316  
E-mail: richarj2@aston.ac.uk



## Facilitating Dream Teams Team Member Survey

### ***What is this survey?***

This is a survey about the team that you are working in at the moment. If you are a member of more than one work team within (*name of organisation*), think about the team which has agreed to participate in the Facilitating Dream Teams Project, and is mentioned in the letter which accompanies this survey.

This survey is not a test and there are no right or wrong answers. We want to know your personal views on the issues raised in the survey and what you think about your team. The survey consists of questions that ask you about how your team works together, as well as some background information about you and your team.

Participation in this project is entirely voluntary and you have the right to withdraw at any time.

### ***How long will it take?***

The questionnaire will take about **20 minutes** to complete.

### ***How do I fill in this survey?***

Please read each question carefully and give your immediate response by circling the number which best matches your personal view, or by filling in the text box provided

### ***Who will see my answers?***

**The information you provide is completely confidential.** No one, other than the researcher, Joanne Richardson, will see your answers. Your answers will provide data for the PhD thesis Joanne Richardson, and aggregated results may be published in academic journals. However, individuals, teams and organisations will not be identifiable.

At the end of the research, you can request a team report. The reports will contain details of key themes within your team, relating to various team processes. Suggestions for improving team interactions will be provided. A written report of key results will also be provided for Head of Organisational Development at (*name of organisation*). However, in both reports, neither individual nor team responses will be identifiable and the report will simply summarise key trends in the data, thus protecting your **anonymity and confidentiality**. These reports will not be distributed elsewhere.

### ***What to do next?***

If you agree to participate in this study, simply complete the survey that follows, and return it to Aston Business School in the pre-paid envelope provided.

If you require any further information, please do not hesitate to contact Joanne Richardson from Aston Business School, at [richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk).

<b>With your team in mind, to what extent do you agree or disagree with the following statements</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
In this team we know what we are trying to achieve	1	2	3	4	5
Team members are committed to achieving the team's objectives	1	2	3	4	5
We agree in the team about what our team objectives are	1	2	3	4	5
In this team we have a shared purpose	1	2	3	4	5
We regularly discuss whether the team is working effectively together	1	2	3	4	5
The team often reviews its objectives	1	2	3	4	5
We regularly reflect upon team performance and how it could be improved	1	2	3	4	5
We have to coordinate our work tightly in this team	1	2	3	4	5
Members of my team have to communicate closely with each other to get the job done	1	2	3	4	5
The team task cannot be achieved without the contribution of every team member	1	2	3	4	5
We decide as a team who will do what in the team	1	2	3	4	5
We are free to decide how to carry out the team's tasks	1	2	3	4	5
In this team we set our own goals	1	2	3	4	5
We are formally recognised as a team within our organisation	1	2	3	4	5
It is clear who the members of our team are	1	2	3	4	5
Members are clear about their own role within the team	1	2	3	4	5
Members are clear about the roles of other team members	1	2	3	4	5

<b>To what extent does your team...</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
view opportunities to do challenging work as important	1	2	3	4	5
try harder after failure	1	2	3	4	5
prefer tasks that require learning new skills	1	2	3	4	5
view opportunities to learn new things as important	1	2	3	4	5
do its best when working on a difficult task	1	2	3	4	5
enjoy trying different approaches to difficult tasks	1	2	3	4	5
enjoy most what they do best	1	2	3	4	5
feel smart when they do something without making mistakes	1	2	3	4	5
like to work on tasks that they have done well on in the past	1	2	3	4	5
feel smart when they can do something better than most other teams	1	2	3	4	5
view the opinions of others concerning the team's performance as important	1	2	3	4	5
like to be fairly confident that they can successfully perform a task before they attempt it	1	2	3	4	5

**In the boxes below, please describe three of your team's main objectives. These should be objectives that your team is currently working towards. Please be as accurate and descriptive as possible**

Objective 1:

Objective 2:

Objective 3:

<b>During the past six months...</b>	<b>Not at all</b>	<b>Somewhat</b>	<b>A moderate amount</b>	<b>Quite a bit</b>	<b>Very much</b>
Has the team discussed whether it is meeting its objectives?	1	2	3	4	5
Have the team's main objectives changed?	1	2	3	4	5
Have the methods used by the team to get the job done changed?	1	2	3	4	5

<b>During the past six months...</b>	<b>Not at all</b>	<b>On a monthly basis</b>	<b>On a weekly basis</b>	<b>On a daily basis</b>	<b>On an hourly basis</b>
How often have you had to work with other members of your team in order for the team to accomplish its goals and responsibilities	1	2	3	4	5
How often have other members of your team had to work together in order for the team to accomplish its goals and responsibilities	1	2	3	4	5

**In the boxes below, please indicate the percentage of time your team spends working on each of the following task types (with the total amount of time adding up to 100%)**

Generating ideas and plans _____ %	Negotiating conflicts _____ %
Choosing between alternatives _____ %	Executing work _____ %

<b>With your team in mind...</b>	Never	Almost never	Sometimes	Most of the time	Always
How often do you make suggestions about better work methods to other team members?	1	2	3	4	5
Do other members of your team usually let you know when you do something that makes their jobs easier (or harder)?	1	2	3	4	5
How often do you let other team members know when they have done something that makes your job easier (or harder)?	1	2	3	4	5
How well do other members of your team recognise your potential	1	2	3	4	5
In busy situations, how often do other team members ask you to help out?	1	2	3	4	5
In busy situations, how often do you volunteer your efforts to help others on your team?	1	2	3	4	5
How willing are you to help finish work that had been assigned to others?	1	2	3	4	5
How willing are other members of your team to help finish work that was assigned to you?	1	2	3	4	5
How well do other members of your team understand your problems and needs?	Not at all	Somewhat	A moderate amount	Quite a bit	Very much
How flexible are you about switching job responsibilities to make things easier for other team members	Not at all	Somewhat	A moderate amount	Quite a bit	Very much

<b>With your team in mind, to what extent do you agree or disagree with the following statements</b>	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
We never really feel like a team when we do our tasks	1	2	3	4	5
I would not miss members of this team if I did not see them again	1	2	3	4	5
We all take responsibility for any good or poor performance by our team	1	2	3	4	5
I feel like I am really part of a team when we do our tasks	1	2	3	4	5

<b>With your team in mind...</b>	Never	Almost never	Sometimes	Most of the time	Always
How often do people outside of the team set your team objectives?	1	2	3	4	5
How often do people outside of the team decide who will do what in the team?	1	2	3	4	5
How often do people outside of the team decide how you will carry out team tasks?	1	2	3	4	5

<b>With your team in mind, to what extent do you agree or disagree with the following statements</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I see myself as a member of my team	1	2	3	4	5
I am glad to be a member of my team	1	2	3	4	5
I feel strong ties with members of my team	1	2	3	4	5
I identify with other members of my team	1	2	3	4	5

<b>Thinking back over the past six months, please indicate how you personally feel about your team</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I am pleased with the way my colleagues and I work together	1	2	3	4	5
I am very satisfied with working in this team	1	2	3	4	5
I am satisfied with my present colleagues in my team	1	2	3	4	5
I learn a great deal from my work on this team	1	2	3	4	5
My own creativity and initiative are suppressed by this team.	1	2	3	4	5
Working on this team stretches my personal knowledge and skills.	1	2	3	4	5

<b>With your team in mind, to what extent do you agree or disagree with the following statements</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
We check on how satisfied others are with us	1	2	3	4	5
We seek feedback on our methods	1	2	3	4	5
We work out how well we are performing in comparison to other teams	1	2	3	4	5
We ask for feedback from internal and external customers on our results	1	2	3	4	5
We check how well we perform as a team	1	2	3	4	5

<b>In this team...</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
We freely challenge routine ways of doing our tasks	1	2	3	4	5
We actively seek new skills and knowledge about our work	1	2	3	4	5
We make use of different team members' expertise when the situation calls for it	1	2	3	4	5
We come up with new solutions in challenging situations	1	2	3	4	5
We discuss different suggestions within the team in order to find the best solution	1	2	3	4	5
We continually learn how to improve performance for the future	1	2	3	4	5
We learn from best practice outside the team	1	2	3	4	5
We learn skills from each other in the team	1	2	3	4	5

<b>To what extent do you agree or disagree with the following statements</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
My team members are loyal to each other	1	2	3	4	5
My team expects to work together for a long time	1	2	3	4	5
My team members trust each other	1	2	3	4	5

With your team in mind, to what extent do you agree or disagree with the following statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My team meets or exceeds its goals	1	2	3	4	5
My team completes its tasks on time	1	2	3	4	5
My team makes sure that products and services meet or exceed quality standards	1	2	3	4	5
My team responds quickly when problems come up	1	2	3	4	5
My team is a productive team	1	2	3	4	5
My team successfully solves problems that slow down our work	1	2	3	4	5

## SECTION B

### Background Details: About you and your team

Please specify your gender <i>(please tick box)</i>	Please specify your age	How long have you worked for <i>(name of organisation)?</i>	How long have you worked in your team?
Male <input type="checkbox"/> Female <input type="checkbox"/>	_____ yrs	_____ yrs _____ months	_____ yrs _____ months

What is your ethnic background? <i>(please tick box)</i>			
<u>White</u>		<u>Black/Black British</u>	<u>Chinese and other ethnic background</u>
British <input type="checkbox"/>	<input type="checkbox"/>	Caribbean <input type="checkbox"/>	Chinese <input type="checkbox"/>
Irish <input type="checkbox"/>	<input type="checkbox"/>	African <input type="checkbox"/>	
Any other white background <input type="checkbox"/>	<input type="checkbox"/>	Any other Black background <input type="checkbox"/>	Any other ethnic background <i>(please specify below)</i>
<u>Mixed</u>		<u>Asian/Asian British</u>	
White and Black Caribbean <input type="checkbox"/>	<input type="checkbox"/>	Indian <input type="checkbox"/>	_____
White and Black African <input type="checkbox"/>	<input type="checkbox"/>	Pakistani <input type="checkbox"/>	
White and Asian <input type="checkbox"/>	<input type="checkbox"/>	Bangladeshi <input type="checkbox"/>	
Any other mixed background <input type="checkbox"/>	<input type="checkbox"/>	Any other Asian background <input type="checkbox"/>	

Please indicate which grade you currently belong to <i>(please tick box)</i>					
<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>
<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>	<i>Anonymised</i> <input type="checkbox"/>

How many people in total work in your team?	How many times does the team meet during the average month?	How many people have joined and/or left the team during the past six months?
_____ people	_____ times	_____ people have joined _____ people have left

<b>To what extent is there a clear overall leader/co-coordinator in your team?</b> <i>(please tick only one box)</i>			
There is a single very clear leader/co-ordinator	<input type="checkbox"/>	There is conflict over who leads/co-ordinates the team	<input type="checkbox"/>
A number of people lead/co-ordinate the team	<input type="checkbox"/>	We all have leadership/co-ordinator roles	<input type="checkbox"/>
There is no clear leader/co-ordinator	<input type="checkbox"/>		

<b>Please indicate which Directorate you currently belong to</b> <i>(please tick box)</i>									
<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>
<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>	<i>Anonymised</i>	<input type="checkbox"/>		

<b>Which division do you belong to?</b>
---

<b>What is your job title?</b>
--------------------------------

<b>How long has your team been set up?</b> <i>(please tick box)</i>		<b>Is the team temporary or permanent?</b> <i>(please tick box)</i>	
Less than 6 months	<input type="checkbox"/>	Between 1 and 2 years	<input type="checkbox"/>
Less than a year	<input type="checkbox"/>	Two years or more	<input type="checkbox"/>
		Temporary	<input type="checkbox"/>
		Permanent	<input type="checkbox"/>

<b>Do you work in any other teams within the organisation?</b> <i>(If so, please indicate how many)</i>	<b>Would you like to receive a feedback report about the overall results of this survey?</b>	<b>Would you like to receive a feedback report about the results of your team?</b>
Yes <input type="checkbox"/> No <input type="checkbox"/>  _____ teams	Yes <input type="checkbox"/> No <input type="checkbox"/>  <i>If yes, please provide e-mail address here:</i>	Yes <input type="checkbox"/> No <input type="checkbox"/>  <i>If yes, please provide e-mail address here:</i>

**END OF QUESTIONNAIRE**

Thank you for your time and effort in completing this questionnaire

Now please return it, as instructed, to the research team at Aston Business School

Team code



## Facilitating Collaboration within Teams

### Team Rater Survey

#### ***What is this survey?***

This survey is on your views about a team within (*name of organisation*) with which we understand you are familiar. Please think about this team when answering this survey. This is not a test and there are no right or wrong answers. The survey consists of questions about how the team works together, as well as some background information about the team. Please think carefully and objectively about the topics raised.

Participation in this project is entirely voluntary and you have the right to withdraw at any time.

#### ***How long will it take?***

The survey will take about **5 minutes** to complete.

#### ***How do I fill in this survey?***

Please read each question carefully and give your immediate response by circling the response which best matches your personal view, or filling out the text box provided.

#### ***Who will see my answers?***

**The information you provide is completely anonymous and confidential.** No one, other than the researcher, Joanne Richardson, will see your answers. Your answers will provide data for the PhD thesis of Joanne Richardson, and aggregated results may be published in academic journals. However, individuals, teams and organisations will not be identifiable.

At the end of the research, participating teams will receive a feedback report on how to improve their team processes. However, the ratings that you provide in this survey will not be included. A written report of key results will also be provided for Head of Organisational Development. However, in both reports, individual and team responses will not be identifiable and the report will simply summarise key trends in the data, thus protecting your ***anonymity and confidentiality***. These reports will not be distributed elsewhere.

#### ***What to do next?***

If you agree to participate in this study, simply complete the survey that follows, and return it to Aston Business School in the pre-paid envelope provided.

If you require any further information, please do not hesitate to contact Joanne Richardson from Aston Business School at [richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk).

To what extent do you agree or disagree with the following statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The team meets or exceeds its goals	1	2	3	4	5
The team completes its tasks on time	1	2	3	4	5
The team makes sure that products and services meet or exceed quality standards	1	2	3	4	5
The team responds quickly when problems come up	1	2	3	4	5
The team is a productive team	1	2	3	4	5
The team successfully solves problems that slow down their work	1	2	3	4	5

During the past 6 months, to what extent do you feel that the team has...	Not at all	A little	Some-what	Con-siderably	Com-pletely
met the <i>standards of quality</i> expected by the organisation?	1	2	3	4	5
met the <i>standards of quantity</i> expected by the organisation?	1	2	3	4	5
met the <i>standards of timeliness</i> expected by the organisation?	1	2	3	4	5
met the <i>standards of implementation</i> expected by the organisation?	1	2	3	4	5
had a <i>reputation for work excellence</i> within the organisation?	1	2	3	4	5

To what extent do you agree or disagree with the following statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Using skills they already possess, this team learns new ways to apply those skills to develop new products that can help attract and serve new markets.	1	2	3	4	5
The team seeks out information about new markets, products, and technologies from sources outside the organisation.	1	2	3	4	5
This team identifies and develops skills that can improve their ability to serve existing business needs.	1	2	3	4	5
This team identifies and develops skills that can help attract and serve new business needs.	1	2	3	4	5
This team learns new ways to apply their knowledge of familiar products and techniques to develop new and unusual solutions to familiar, routine problems.	1	2	3	4	5
This team seeks out information on products and techniques that are new to the operation and learns how to apply them to develop new solutions to routine problems.	1	2	3	4	5
This team seeks out and acquires information that may be useful in developing multiple solutions to problems.	1	2	3	4	5
This team seeks out and acquires knowledge that may be useful in satisfying needs unforeseen by the client.	1	2	3	4	5

During the past six months...	Not at all	On a monthly basis	On a weekly basis	On a daily basis	On an hourly basis
How often have members of the team had to work <i>closely</i> with one another in order to accomplish its goals and responsibilities	1	2	3	4	5

To what extent do you agree or disagree with the following statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The team is rewarded as a group	1	2	3	4	5
The team gets paid, at least in part, as a group	1	2	3	4	5
The team members are cross-trained to do different jobs on the team	1	2	3	4	5
The team members are cross-trained to do work on other teams	1	2	3	4	5
The team gets to decide who can be a member of the team	1	2	3	4	5
The team trains its own members to do the jobs	1	2	3	4	5
The team punishes its members if they get out of line	1	2	3	4	5
The team can fire its members if they need to	1	2	3	4	5
The team has the opportunity to learn new skills	1	2	3	4	5
The team participates in activities designed to develop new skills	1	2	3	4	5
The team formally evaluates the performance of its own members	1	2	3	4	5

With the team in mind...	Never	Almost never	Sometimes	Most of the time	Always
How often do people outside of the team set the teams objectives?	1	2	3	4	5
How often do people outside of the team decide who will do what in the team?	1	2	3	4	5
How often do people outside of the team decide how the team will carry out their tasks?	1	2	3	4	5

During the past six months...	Not at all	Somewhat	A moderate amount	Quite a bit	Very much
Has the team discussed whether it is meeting its objectives?	1	2	3	4	5
Have the team's main objectives changed?	1	2	3	4	5
Have the methods used by the team to get the job done changed?	1	2	3	4	5

How many people in total work in the team?	How many times does the team meet during the average month?	How many people have joined and/or left the team during the past six months?
_____ people	_____ times	_____ people have joined _____ people have left

**The team will soon receive feedback on the information that they provided in their own team member surveys. This feedback will guide them on how they might improve team processes and interactions in the future. In order to see if there are any changes in team effectiveness, would you be willing to re-complete this survey in three months time? (Please tick box below)**

Yes, I will be happy to re-complete this survey       No, I will not be willing to complete this survey

## END OF QUESTIONNAIRE

Thank you for your time and effort in completing this questionnaire.  
Now please return it, as instructed, to the research team at Aston Business School.  
Team Code



## Facilitating Dream Teams Feedback Report

Prepared for:

*'Name of team'*

Report prepared by:

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Aston Business School  
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April 2009

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## About the Facilitating Dream Teams Feedback Report

This report contains your team feedback based on the 'Facilitating Dream Teams' (FDT) survey that members of your team recently completed. This report is for the use of your team, and your team only. An electronic copy of this report will only be sent to the team contact for your team, and members of the team who indicated in the survey that they wished to receive a copy of their team's report and provided an e-mail address. The report will not be disseminated elsewhere.

The questions asked in the FDT survey were suggested by previous research to represent a number of specific team processes and behaviours which have been linked to team effectiveness, productivity and creativity in a wide variety of organisational settings. The FDT survey was designed to probe these critical work practices and help to uncover areas of success, as well as areas for development in your current work team. Nevertheless, some of the constructs described in this report may be more relevant for your team than others, depending on your team's everyday work. Thus, this report is not intended to be judgemental as to whether or not you team is a dream team or not. Rather, we believe that you and your team will know better than us how to interpret the results, depending on your team's past experiences, unique tasks and characteristics, as well as the nature of your wider work environment. Many of the questions in the survey required you to think about the past 6 months, and therefore the timeframe used generally refers to more recent developments in your team.

### How was this feedback report generated?

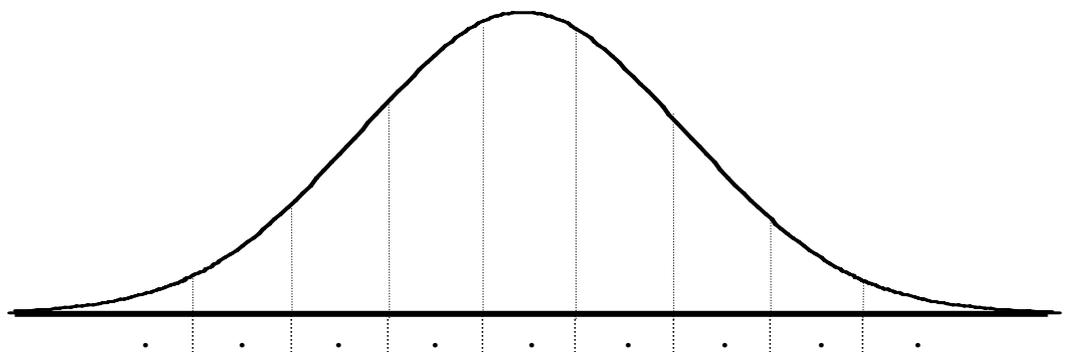
The team feedback report mirrors your *team's* opinion about how well you are currently working together. Based on each team members' views, responses to the FDT survey were aggregated to the team-level of analysis and a 'raw score' for each construct was calculated for your team. Therefore it is not possible to tell how any one team member answered the FDT survey. These raw scores were then converted in to 'comparison scores' and compared with a representative sample of more than 600 staff working in over 60 teams across (*name of organisation*). This norm group allowed us to identify whether your team's 'comparison score' for each construct lay in the average range, or whether it was above or below average. If a comparison score for a given construct lay *above* the average range, we suggest that this may represent an area of strength and excellence within your team. If a comparison score for a given construct lay *below* the average range, we suggest that this may represent an area for potential development opportunity for your team, and provide some practical guidelines on how your team might look to improve in this area. If a comparison score for a given construct lay *within* the average range, we also provide some practical guidelines on how to *further* improve your team, should you so wish.

### How should we use this report?

Please remember that although we talk about 'team scores' throughout the report; these scores are only representative of the number of your team members who returned a completed FDT survey. For the (*name of team*), 4 members returned a completed survey. The following page provides your FDT team profile, which summarises your key results in comparison to other teams within (*name of organisation*). We suggest that you start by looking at this profile and selectively pick out which constructs you find most useful and relevant for your team. Detailed feedback on each of the constructs can then be found in the second part of the report, along with practical guidelines for development and improvement. We hope that the information included in this report will stimulate positive reflection in your team, helping you to think about how you might improve your team interactions in future. If you wish to feed back your opinion about this report, or have any further questions, please contact Joanne Richardson on the details provided on the front page.

### Facilitating Dream Teams: Your Team Profile Summary

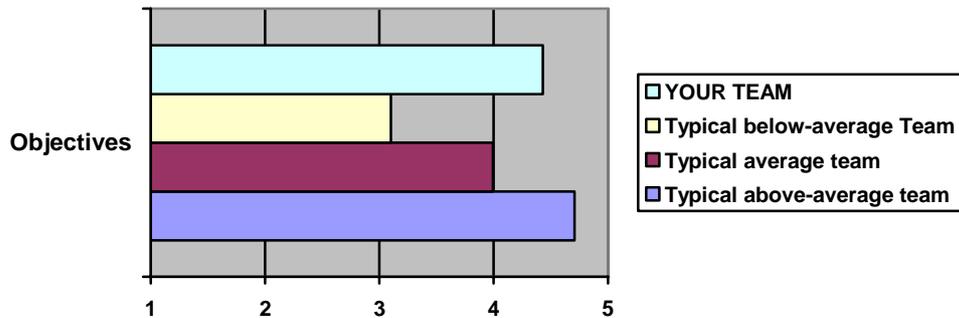
Dream Team Construct	Construct Definition	Comparison Score								
		Below Average			Average			Above Average		
		1	2	3	4	5	6	7	8	9
<b>Objectives</b>	Objectives define the extent to which a team has clear goals, on which team members agree and are committed too.	•	•	•	•	•	•	•	•	•
<b>Reflexivity</b>	Reflexivity is the degree to a team collectively reflects upon their immediate and long term objectives, processes and strategies and adapts them accordingly.	•	•	•	•	•	•	•	•	•
<b>Interdependence</b>	Interdependence refers to the extent to which team members rely on one another to complete team tasks and meet team objectives.	•	•	•	•	•	•	•	•	•
<b>Autonomy</b>	Autonomy is the amount of control and discretion a team has in carrying out their tasks	•	•	•	•	•	•	•	•	•
<b>Role Clarity</b>	Role clarity refers to the extent to which team member roles are clear, distinguishable and understood by everyone within the team.	•	•	•	•	•	•	•	•	•
<b>Boundedness</b>	Boundedness refers to the extent to which team membership is clear, and the team is recognised as a team by others in the organisation.	•	•	•	•	•	•	•	•	•
<b>Learning Behaviour</b>	Learning behaviour is a set of complementary team member behaviours which together elicit adaptability, change and improvement in a team's knowledge, skills and abilities	•	•	•	•	•	•	•	•	•
<b>Attachment</b>	Attachment refers to a team member's propensity to seek security within their team.	•	•	•	•	•	•	•	•	•
<b>Satisfaction</b>	Satisfaction is the extent to which team members are happy with their present team colleagues, and the overall way in which the team works together.	•	•	•	•	•	•	•	•	•



<b>% teams in sample:</b>	4	7	12	17	20	17	12	7	4 ( $\Sigma=100$ )
<b>Comparison score:</b>	1	2	3	4	5	6	7	8	9

## Dimension 1: Objectives

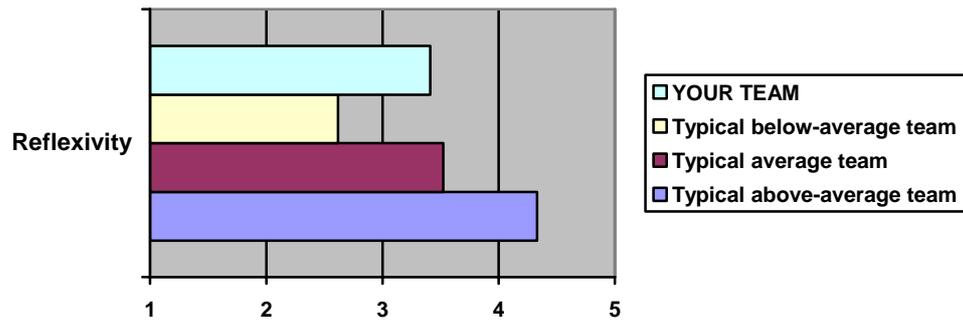
Research has shown that team level goals and objectives, which include a clearly defined purpose or mission statement, are critical to team effectiveness and performance. A clear objectives gives team members the incentive to combine their efforts and collaborate closely in their work. The setting of clear team objectives not only helps team members to realise their goal interdependence, but has also been shown to improve and sustain higher performance, motivation and team member satisfaction. The chart below shows how your team's 'raw score' on objectives compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



- In comparison with other teams within (*name of organisation*), the objectives in your team lies within the above average range.
- Your team's raw score of 4.43 falls above the average raw score of 3.99 in the sample, and above the raw score of 4.41 which marks the above average teams.
- This suggests that your team has clear team-level objectives which all team members agree upon and are committed too.
- Research has shown that team level objectives and goals, which include a clearly defined purpose or mission statement, are critical to team effectiveness and performance
- Clear team level objectives encourage team members to combine their efforts and collaborate closely in their work together. Effective goal setting behaviour in teams has also been shown sustain higher performance, motivation and team member satisfaction
- **Congratulations!** You should celebrate this area of strength and within your team.
- In order to **maintain** the clarity of your team's objectives hold regular team meetings during which all members take time to deliberately discuss and agree upon an overall vision for the team.
- Discuss some short team objectives through which this vision might be achieved. Formulate these objectives *together* in your team and make sure that they are specific, measurable, challenging and scheduled. This means stating them clearly, in numerical form (where possible), and within a designated time period.
- Always limit your team to four or five objectives at a time.

## Dimension 2: Reflexivity

Reflexivity involves reflecting upon and learning from previous experience and then initiating appropriate change. Team reflexivity is the degree to which members of a team collectively reflect upon their immediate and long term objectives, processes and strategies and adapt them accordingly. A high level of team reflexivity is characterised by attention to detail and consideration of alternatives. Research has shown that teams which take time out to reflect upon their objectives, strategies and processes are more effective than those that do not; be they television production teams, sports teams or health care teams. Reflexive teams also tend to be more creative and come up with more innovative solutions to problems. The chart below shows how your team's 'raw score' on reflexivity compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



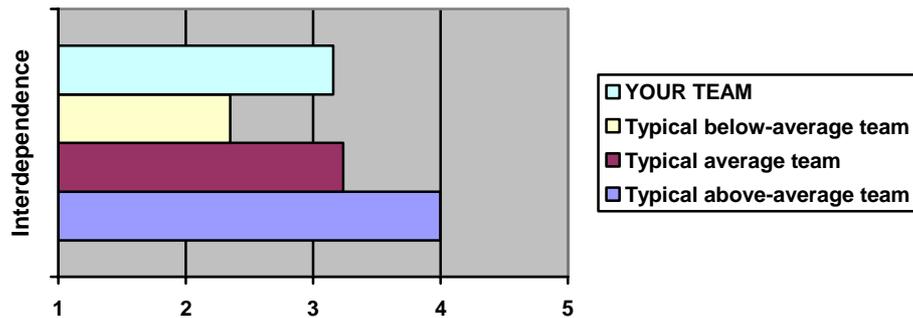
- In comparison with other teams within (*name of organisation*), the extent to which your team engages in reflexivity lies within the average range.
- Your team's raw score of 3.41 falls just below the average raw score of 3.52 in the sample, and below the raw score of 3.94 which marks the above average teams.
- This suggests that members of your team reflect upon their objectives, processes and performance as much an average team in the sample. However, there is room for further improvement in reflexivity, should you think this would be relevant and helpful for your team.

### Tips for Development

- In order to improve team reflexivity your team should actively and periodically take time out to reflect on what you are doing. This includes reflecting on your short and long term objectives, the processes by which you carry out your work, as well as your performance outcomes.
- During reflexive sessions, ask fundamental questions such as '*why are we doing this?*' as this helps cultivate self-awareness in your team.
- When things go wrong, the team should always ask '*what can we learn from this?*' Even when you meet your goals, don't just celebrate, but search for underlying reasons behind your successes to improve the chances that such conditions can be replicated in the future.
- Make *changes* on the basis of what you discuss. Intended actions should be clear and ordered in terms of their priority. Each action should also have a clearly specified time span in which it will be carried out.
- Remember, successful team reflexivity requires a high degree of *trust* and *openness* between team members, since reflexive discussions are likely to reveal discrepancies between how the team actually is and how it should be performing. Therefore, try to develop a *supportive team environment* within which team members cooperate rather than compete.

### Dimension 3: Interdependence

Interdependence refers to a team's collective tasks, goals and outcomes. It describes the extent to which team members rely on one another to complete their tasks, goals and outcomes and meet each others needs. Previous research has shown that teams who have to work together closely in order to complete their tasks and meet shared objectives are more likely to be high performing and have more satisfied members. Interdependent teams are also more capable of carrying out complex and multidisciplinary tasks, and as a result are likely to achieve much more than a group of individuals working in isolation. The chart below shows how your team's 'raw score' on interdependence compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



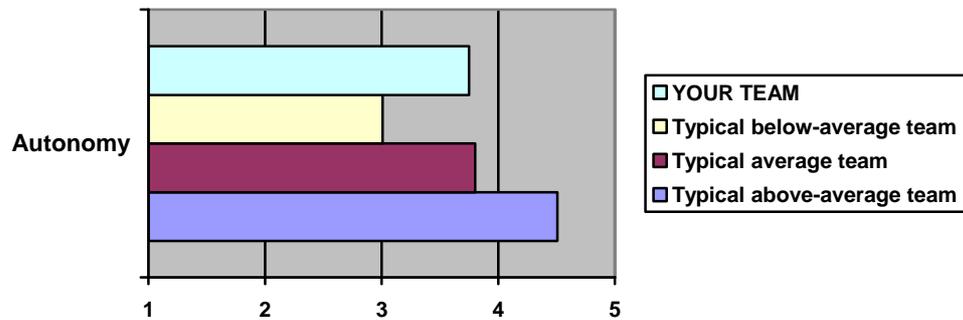
- In comparison with other teams within (*name of organisation*), the extent to which your team perceives itself as interdependent lies within the average range.
- Your team's raw score of 3.16 falls close to the average raw score of 3.24 in the sample, but below the raw score of 3.61 which marks the above average teams.
- This suggests that members of your team rely on one another to complete their tasks, goals and outcomes as much an average team in the sample. However, there is some development opportunity in relation to your team interdependence, should you think this would be relevant and helpful for your team.

#### Tips for Development

- To improve the level of interdependence in your team ensure that successful completion of your team tasks and the meeting of your team objectives require a significant, valued and recognised contribution from *every* member of your team.
- Clearly articulated team levels objectives can help team members to recognise their interdependence, and motivate them to engage in collective action. Breaking down larger tasks into sub-tasks can also help this process.
- Every team member should be assigned clearly defined roles (see page 9), all of which are important in meeting the teams overall vision. Your team leader should ensure that everyone clearly understands how individual roles and objectives interdependently relate to one another, as well as to the overall team objectives.
- Remember, interdependence is very much governed by the sorts of *tasks* your team does. Therefore, improving the level of team interdependence may be difficult if the sorts of tasks you do are better executed by individuals working alone rather than groups of people working interdependently. Interdependence requires involving *everyone* in the execution of team tasks, so try to involve as many team members as possible.

## Dimension 4: Autonomy

Team autonomy is the amount of control and discretion a team has in carrying out their tasks. High autonomy is facilitated through empowering team members with decision-making authority and information, allowing the team to determine its own course of action. Research has shown that this empowerment can heighten an overall sense of determination and motivation within a team. Teams with high levels of autonomy can also improve their effectiveness by changing things at a local level in order to adapt to the demands of their wider environment. Teams which do not have a certain degree of autonomy and freedom to accomplish their tasks may experience frustration and disappointment. The chart below shows how your team's 'raw score' on autonomy compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



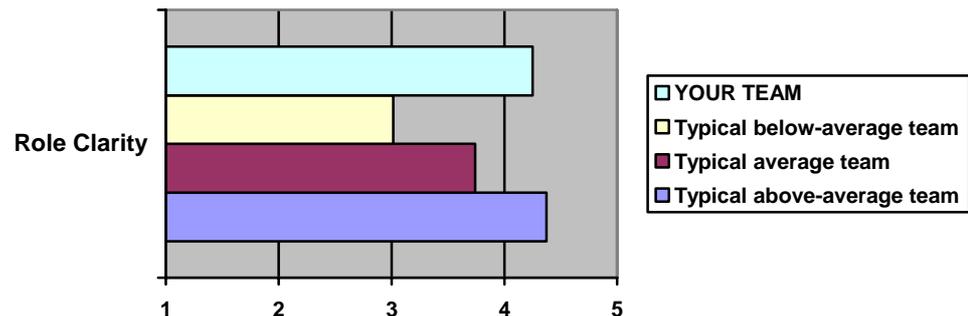
- In comparison with other teams within (*name of organisation*), the extent to which your team perceives itself as autonomous lies within the average range.
- Your team's raw score of 3.75 falls very closely to the average raw score of 3.80 in the sample, but below the raw score of 4.16 which marks the above average teams.
- This suggests that the amount of control and discretion your team has in carrying out your tasks is around the same as an average team in the sample. Members of your team perceive that the team has a good degree of autonomy, although the team could still potentially be allocated more autonomy over their work practices, should you think this would be relevant and helpful for your team.

### Tips for Development

- More autonomy means that your team would have more responsibility, and therefore you firstly need to ensure that you have the *appropriate skills* and *resources* to cope with this.
- In order to delegate more autonomy to the team, a team leader (or line manager) should demonstrate that they trust team members and have belief in their abilities, empowering the team to determine the means by which they will achieve their ends.
- Assigning autonomy does not always involve delegating big decisions or responsibility to the team - it can be as simple as allowing team members to decide between themselves when they take lunch breaks.
- Try to involve team members in as much of decision making about the team as is possible. These might include decisions about team membership, reward, or new training. This level of involvement will empower team members and develop a sense of shared ownership.
- One the other hand, make sure that you don't provide team members with *too much* autonomy in one go as this level of responsibility and change can be overwhelming and create anxiety in the team. Some teams may *prefer* to have their work delegated to them.

## Dimension 5: Role Clarity

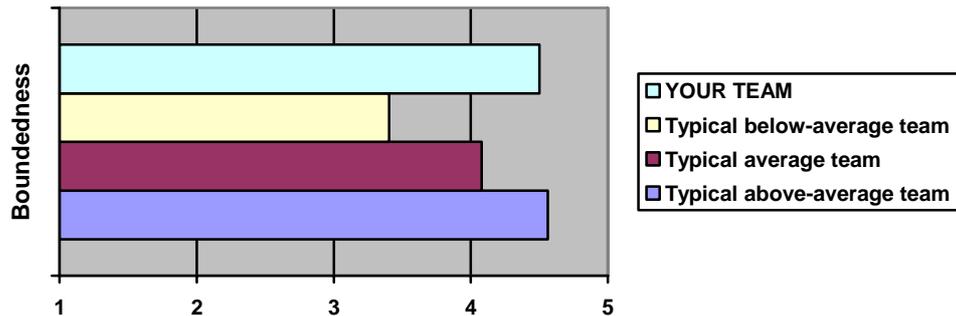
Team member role clarity refers to the extent to which team roles are clear, distinguishable and understood by everyone else within the team. High role clarity signifies that team members are satisfied that they have enough role-relevant information about their job. Previous research has shown that when role clarity is high, team members are able to recognise their interdependence and the importance that their own contribution has in completing the team task. Clear team roles also help to establish norms about what sorts of behaviours are expected within a team – which can be particularly helpful for newer team members. Conversely, in teams with low levels of role clarity, team members will be unclear about what is expected of them, or may experience conflicting role requirements, which can lead to reduced satisfaction and increased tension within the team. The chart below shows how your team's 'raw score' on role clarity compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



- In comparison with other teams within (*name of organisation*), the role clarity within your team lies above the average range.
- Your team's raw score of 4.25 falls above the average raw score of 3.74 in the sample, and above the raw score of 4.0 which marks the above average teams.
- This suggests that your team members clearly understand who is doing what in the team, and who is accountable for a given task or responsibility.
- Role clarity is particularly important in highly interdependent teams, as performance depends largely upon the effective interaction of team members.
- Clearly defined team roles are likely to foster stability and constancy within your team. Although team membership may change over time, clearly defined roles that guide expected behaviour will ensure that your team remains enact and viable.
- **Congratulations!** You should celebrate this area of strength and within your team.
- In order to **maintain** high levels of role clarity, your team members should regularly discuss their roles, responsibilities and personal career objectives for the future. This will ensure that each member's *personal strengths* and *skills* are being deployed most effectively according to the team's current circumstances.
- Each team members role should be explained and reiterated to the whole team, so that it is clear to every team member *who is doing what* in the team, and who is accountable for a given task or responsibility.
- Any ambiguities and discrepancies should be openly discussed and resolved within in team. Such discussions also ensure that workload is being distributed evenly between team members, recognising the need for fairness, equality and interdependence.

## Dimension 6: Boundedness

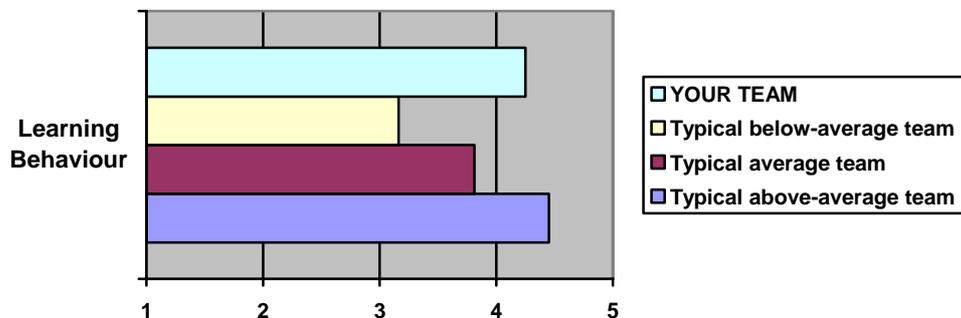
Team boundedness refers to the extent to which team membership is clear, and your team is recognised as a team by others. In order to work well together team members must know who is in the team. Previous research has shown that teams who are more bounded are able to develop a team climate which is characterised by trust and openness, in which team members feel comfortable in expressing their views. Members of more bounded teams are also able to anticipate one another's actions and behaviours, and are therefore more likely to avoid mistakes and errors. However, if individuals cannot reliably distinguish between who is in the team and who is not, there will be ambiguity about who shares accountability and responsibility for the completion of a team task, and the team is unlikely to be effective. The chart below shows how your team's 'raw score' on boundedness compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



- In comparison with other teams within (*name of organisation*), boundedness within your team lies in the above average range.
- Your team's raw score of 4.50 falls above the average raw score of 4.10 in the sample, and above the level of 4.37 which marks the above average teams.
- This suggests that your team members clearly understand team membership, and know exactly who is and who is not on your team.
- Your team also perceives itself as being clearly recognised as a team by other members of (*name of organisation*).
- This clear and stable membership will help to build a strong sense of team identification within your team.
- **Congratulations!** You should celebrate this area of strength and within your team.
- In order to **maintain** team boundedness, ensure that team membership remains clear and explicit. Team members should always understand exactly who is on the team, and who is not.
- If you are increasingly relying on virtual types communication, encourage close contact and frequent communication between team members, and try to meet face-to-face as much as possible.
- Team rewards (rather than individual rewards) are also effective for the development of shared values, a stronger team identity and a collective sense of shared fate.
- Always promote yourselves as a team in your organisational environment. This will help others within (*name of organisation*) to clearly recognise your group as a team.

## Dimension 7: Learning Behaviour

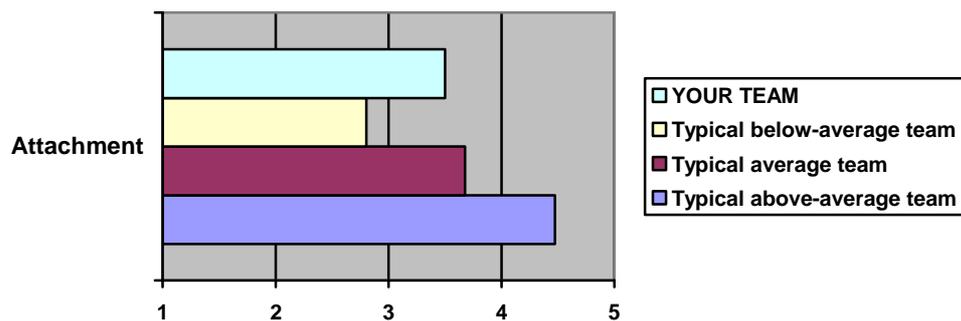
Team learning behaviour is a set of complementary behaviours displayed by team members which together elicit adaptability, change and improvement in a team's knowledge, skills and abilities. Such behaviours, which include learning from best practice outside the team, challenging routines, recognising and profiting on different team members' expertise, acquiring new skills and knowledge about tasks and engaging in constructive controversy facilitate the overall development of a team climate for learning in which team members have the opportunity to explore new possibilities, and adaptability and change become the norm. Such learning behaviours have been linked to overall team effectiveness and team innovation. Sadly however, some teams function in ways which inhibit the personal development of team members. For example, collaborative discussions may be inhibited because of one or two dominant team members. In other teams, members fail to acknowledge their team mates' achievements or provide little positive feedback on performance. 'Blame cultures' in teams can also inhibit team learning behaviours. The chart below shows how your team's 'raw score' on learning behaviour compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



- In comparison with other teams within (*name of organisation*), learning in your team lies within the above average range.
- Your team's raw score of 4.25 falls above the average raw score of 3.81 in the sample, and above the raw score of 4.15 which marks the above average teams.
- This suggests that your team members engage in team learning behaviours more often than the average team in the sample.
- Research has shown that such learning behaviour can lead to improved effectiveness – particularly with regards to team creativity and innovation.
- **Congratulations!** You should celebrate this area of strength and within your team.
- In order to **maintain** high levels of learning behaviour in your team, don't just focus on what you are typically good at as this can lead to habitual routines and lack of creativity. Be open to try new tasks, methods and technologies and where appropriate, *challenge the status quo*.
- Identify, observe and talk to *best-practice teams* within your work environment in order to get a fresh perspective about your own team.
- As team members you should monitor your own learning and development – this could be supported via ongoing appraisals or reviews to ensure that team members have the opportunity to acquire new skills and knowledge that they can share with the team.

## Dimension 8: Attachment

The concept of group attachment refers to an individual's propensity to seek security within their team. Research has demonstrated that an individual's inclination to form an attachment to their team, and the nature of this attachment, can influence the degree to which they identify with the team, and in turn, the extent to which they trust and cooperate within the team. Healthy team attachments are characterised by friendly, accepting and interpersonal styles, and by mutual respect, an awareness of others' needs and concerns, and a genuine interest in each other's well-being. Individuals who are securely attached to their team feel safe in their organisational environment, knowing that their group will be attentive to their work needs. This secure base encourages the individual to work interdependently with their team colleagues, take up new ventures and risks, maintain frequent contact with their team and openly share information. The chart below shows how your team's 'raw score' on attachment compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



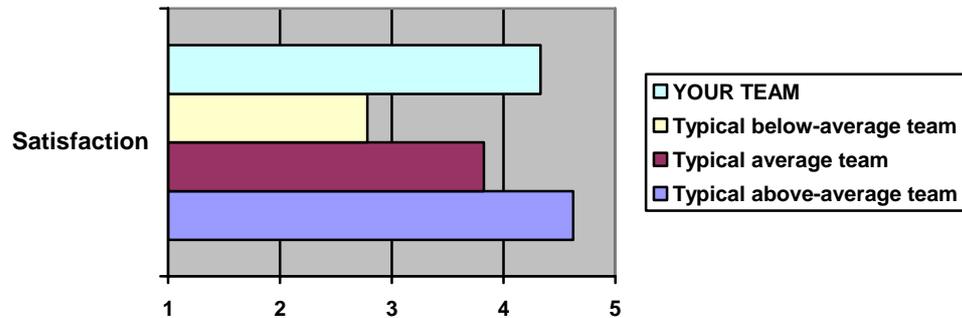
- In comparison with other teams within (*name of organisation*), attachment within your team lies within the average range.
- Your team's raw score of 3.25 falls below the average raw score of 3.68 in the sample, and below the raw score of 4.14 which marks the above average teams.
- This suggests that your team members perceive their team attachment as being around a similar level to the average team in the sample, but there is still room for improvement on this construct, should it be relevant for your team.

### Tips for Development

- Attachment takes time to develop so try to maintain at least moderate stability in membership allowing members to establish lasting familiar and close relationships characterised by trust, commitment and consistency.
- Try to work in close proximity so that you see each other on a regular basis. Electronic forms of communication such as video calls and e-mails, are relatively impoverished and militate against the development of a strong sense of team belonging. Spend time face-to-face.
- Encourage *intense team working*, in which team members work together closely, put effort into engaging with one another and concentrate on achieving the team task at hand. Working in an intense team environment on a shared team task, will generate a shared sense of belonging, in which strong team attachments can form.
- Actively help avoidant and distant team members integrate into the team by creating a strong group identity, in which team members openly appreciate one another's efforts and value their closeness and interdependence. Finally, reward team output rather than individual contributions, and treat all team members fairly and consistently.

## Dimension 9: Satisfaction

Satisfaction refers to the extent to which team members are happy with their present team colleagues, and the way in which the team works together. As discussed throughout this report, satisfaction is very much an outcome measure of teams and we would therefore expect team satisfaction to increase in alignment with many constructs that have already been discussed. For example, we could expect to see a positive relationship between team attachment and team satisfaction, or objectives and team satisfaction. The chart below shows how your team's 'raw score' on satisfaction compares with a typical below-average team, a typical average team, and a typical above-average team in (*name of organisation*).



- In comparison with other teams within (*name of organisation*), satisfaction within your team lies above the average range.
- Your team's raw score of 4.33 falls above the average raw score of 3.83 in the sample, and above the raw score of 4.25 which marks the above average teams.
- This suggests that your team is satisfied with the way the team works currently together. The team is also happy working with present team members, and team members generally feel that they learn from the team.
- Research has shown that high levels satisfaction has been positively related to greater levels of performance and effectiveness.
- **Congratulations!** You should celebrate this area of strength and within your team.
- Remember that even in highly satisfied teams, there is always the possibility for improving current ways of doing things. If a team fails to constantly reflect upon current processes and strategies, and remain adaptive to meet the increasingly complex environment around them, there is a danger that they can become stagnant, inflexible and may lack creativity.
- Team satisfaction is a broad concept and very much depends on the particular individual and team at hand. We therefore suggest that in order to maintain the high levels of satisfaction currently in your team, that you focus on the '*tips for development*' throughout this report, and implement those which make most sense for your particular team depending on its unique members, circumstances and work environment.

## END OF REPORT

On behalf of Aston Business School, many thanks for participating in the Facilitating Dream Teams Project. Your support with the project is greatly appreciated and we hope that you have found the feedback from this report useful and beneficial for your team!

## APPENDIX C:

### Appendix C.1: Cognitive interview schedule

#### Cognitive Interview Schedule

Before the interview begins, participants will be de-briefed about the nature of the research and what their participation involves. The researcher will assure that confidentiality and anonymity will be maintained throughout. Participants will be asked if they consent to having the interview tape recorded, so that the researcher can listen back over the interview and ensure that all details are taken down accurately. Participants will then be given ten minutes to read over the 20 items that aim to capture the extent to which a team is a 'real team'. The interviews will then begin which are anticipated to last no longer than 15 minutes.

#### Structured Interview Schedule

- 1) Does the layout of the questionnaire make sense to you?
- 2) Are there any parts that you don't understand?
- 3) Are any of the questions unclear?
- 4) In referring to question 2, what do you think of when thinking about team members being *committed* to achieving their team objectives?
- 5) In referring to question 4, what do you consider to be meant by a 'shared purpose'?
- 6) With specific reference to question 5, what do you consider to be meant as 'regularly' (*probe to see if this would this be hourly, daily, weekly etc.*)
- 7) Do you think the word 'regularly' should be replaced with something else?
- 8) Looking at question 8, do you think there is a difference in meaning between the words 'communication' and 'cooperation'?
- 9) Do you think any of the questions are unnecessary or should not be included for any reason? (*if so, probe for reasons*)

Participants will then be given the opportunity to ask any questions. They will then be thanked for their participation before the close of the interview.

## Appendix C.2: Item sorting task

### Participant Instructions:

In front of you, you will see six categories (*each of the real team criteria*). Please read each of these carefully before doing anything else. Next, you will see that there are a pile of 20 slips of paper, each of which has a different statement printed in it. Your task is to read each of these statements and then assign it to one of the six categories. As you do so, please use the rating sheet below to record how easy or difficult it was to assign the statement to the category you have chosen. You have Please ask the researcher if you have any questions.

How did you find assigning the item to the category you chose? ( <i>please circle</i> )	Very Difficult	-	-	-	Very Easy
We agree in the team about what our team objectives are	1	2	3	4	5
Team members are committed to achieving the team's objectives	1	2	3	4	5
We regularly reflect upon team performance and how it could be improved	1	2	3	4	5
In this team we have a shared purpose	1	2	3	4	5
Members are clear about the roles of other team members	1	2	3	4	5
The team often reviews its objectives	1	2	3	4	5
Membership of our team is frequently changing	1	2	3	4	5
We meet together frequently to ensure effective communication and cooperation	1	2	3	4	5
We are formally recognised as a team within our organisation	1	2	3	4	5
We have to coordinate our work tightly in this team	1	2	3	4	5
Members of my team have to communicate closely with each other to get the job done	1	2	3	4	5
The team task cannot be achieved without the contribution of every team member	1	2	3	4	5
We decide as a team who will do what in the team	1	2	3	4	5
We are free to decide how to carry out the team's tasks	1	2	3	4	5
We regularly discuss whether the team is working effectively together	1	2	3	4	5
In this team we know what we are trying to achieve	1	2	3	4	5
It is clear who the members of our team are	1	2	3	4	5
In this team we hold regular face-to-face meetings	1	2	3	4	5
Members are clear about their own role within the team	1	2	3	4	5
In this team we set our own goals	1	2	3	4	5

### Appendix C.3: Initial item pool

Table C.8: Real team item pool: initial 17 item version

Real Team sub-dimension	Item
Shared objectives	1. In this team we know what we are trying to achieve
	2. Team members are committed to achieving the team's objectives
	3. We agree in the team about what our team objectives are
	4. In this team we have a shared purpose
Reflexivity	5. We regularly discuss whether the team is working effectively together
	6. The team often reviews its objectives
	7. We regularly reflect upon team performance and how it could be improved
Interdependence	8. We have to coordinate our work tightly in this team
	9. Members of my team have to communicate closely with each other to get the job done
	10. The team task cannot be achieved without the contribution of every team member
Autonomy	11. We decide as a team who will do what in the team
	12. We are free to decide how to carry out the team's tasks
	13. In this team we set our own goals
Boundedness	14. We are formally recognised as a team within our organisation
	15. It is clear who the members of our team are
Specified roles	16. Members are clear about their own role within the team
	17. Members are clear about the roles of other team members

## Appendix C.4: Descriptive statistics and correlation matrices for all samples

**Table C.9: Item mean, standard deviation, kurtosis and skewness (sample 1)**

	Mean	S.D	Kurtosis	Skewness
1. In this team we know what we are trying to achieve (ob1)	4.15	.79	3.86	-1.41
2. Team members are committed to achieving the team's objectives (ob2)	4.06	.81	.36	-.83
3. We agree in the team about what our team objectives are (ob3)	3.79	.89	.97	-.83
4. In this team we have a shared purpose (ob4)	3.93	.86	.76	-.90
5. We regularly discuss whether the team is working effectively together (ref1)	3.51	1.14	-.82	-.10
6. The team often reviews its objectives (ref2)	3.58	1.05	-.88	-.20
7. We regularly reflect upon team performance and how it could be improved (ref3)	3.55	1.10	-.57	-.49
8. We have to coordinate our work tightly in this team (int1)	3.62	1.00	-.53	-.19
9. Members of my team have to communicate closely with each other to get the job done (int2)	3.85	.92	.03	-.55
10. The team task cannot be achieved without the contribution of every team member (int3)	3.68	1.04	-1.20	-.05
11. We decide as a team who will do what in the team (aut1)	3.14	1.08	1.06	-1.05
12. We are free to decide how to carry out the team's tasks (aut2)	3.24	1.03	-.09	-.47
13. In this team we set our own goals (aut3)	3.10	1.09	-.66	-.29
14. We are formally recognised as a team within our organisation (bou1)	3.96	.96	.39	-.56
15. It is clear who the members of our team are (bou2)	4.23	.75	2.19	-1.27
16. Members are clear about their own role within the team (rol1)	3.82	.91	.21	-.77
17. Members are clear about the roles of other team members (rol2)	3.55	1.05	1.25	-.97

**Table C.10: Correlation matrix for 17-item scale (sample 1)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. In this team we know what we are trying to achieve (ob1)																	
2. Team members are committed to achieving the team's objectives (ob2)	.71**																
	318																
3. We agree in the team about what our team objectives are (ob3)	.66**	.65**															
	317	319															
4. In this team we have a shared purpose (ob4)	.68**	.69**	.65**														
	318	319	318														
5. We regularly discuss whether the team is working effectively together (ref1)	.54**	.46**	.59**	.54**													
	317	319	319	318													
6. The team often reviews its objectives (ref2)	.59**	.52**	.57**	.55**	.71**												
	318	320	319	319	319												
7. We regularly reflect upon team performance and how it could be improved (ref3)	.48**	.48**	.54**	.50**	.75**	.73**											
	316	318	318	317	318	318											
8. We have to coordinate our work tightly in this team (int1)	.43**	.47**	.50**	.47**	.46**	.48**	.53**										
	316	318	317	317	317	318	316										

9. Members of my team have to communicate closely with each other to get the job done (int2)	.32**	.34**	.40**	.41**	.34**	.32**	.41**	.62**									
	317	319	318	318	318	319	317	317									
10. The team task cannot be achieved without the contribution of every team member (int3)	.37**	.28**	.35**	.37**	.37**	.34**	.39**	.42**	.37**								
	318	320	319	319	319	320	318	318	319								
11. We decide as a team who will do what in the team (aut1)	.41**	.39**	.49**	.45**	.44**	.41**	.48**	.46**	.40**	.32**							
	317	319	318	318	318	319	317	317	318	319							
12. We are free to decide how to carry out the team's tasks (aut2)	.25**	.26**	.27**	.28**	.21**	.21**	.17**	.22**	.24**	.14**	.49**						
	317	319	318	318	318	319	317	317	318	319	318						
13. In this team we set our own goals (aut3)	.20**	.19**	.27**	.21**	.23**	.24**	.19**	.27**	.24**	.14*	.44**	.61**					
	317	319	318	318	318	319	317	317	318	319	318	318					
14. We are formally recognised as a team within our organisation (bou1)	.22**	.19**	.21**	.28**	.20**	.26**	.24**	.20**	.17**	.14*	.19**	.11*	.17**				
	316	318	317	317	318	318	316	316	317	318	317	317	317				
15. It is clear who the members of our team are (bou2)	.40**	.36**	.32**	.41**	.34**	.37**	.30**	.38**	.39**	.28**	.32**	.23**	.25**	.46**			
	318	320	319	319	319	320	318	.318	319	320	319	319	319	318			
16. Members are clear about their own role within the team (rol1)	.57**	.56**	.46**	.54**	.38**	.48**	.36**	.34**	.23**	.25**	.40**	.21**	.20**	.32**	.36**		
	318	320	319	319	319	320	318	318	319	320	319	319	319	318	320		
17. Members are clear about the roles of other team members (rol2)	.52**	.57**	.50**	.57**	.39**	.49**	.39**	.47**	.33**	.30**	.51**	.26**	.28**	.37**	.46**	.73**	
	317	319	318	318	318	319	317	317	318	319	318	318	318	317	319	319	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table C.11: Item mean, standard deviation, kurtosis and skewness (sample 2)**

	<b>Mean</b>	<b>S.D</b>	<b>Kurtosis</b>	<b>Skewness</b>
1. In this team we know what we are trying to achieve (ob1)	4.13	.80	2.21	-1.19
2. Team members are committed to achieving the team's objectives (ob2)	4.00	.83	1.29	-.98
3. We agree in the team about what our team objectives are (ob3)	3.78	.88	.73	-.81
4. In this team we have a shared purpose (ob4)	3.91	.90	.58	-.83
5. We regularly discuss whether the team is working effectively together (ref1)	3.49	1.16	-.53	-.57
6. The team often reviews its objectives (ref2)	3.53	1.03	-.29	-.58
7. We regularly reflect upon team performance and how it could be improved (ref3)	3.55	1.08	-.40	-.60
8. We have to coordinate our work tightly in this team (int1)	3.70	.95	.13	-.64
9. Members of my team have to communicate closely with each other to get the job done (int2)	3.86	.94	.55	-.85
10. The team task cannot be achieved without the contribution of every team member (int3)	3.74	1.05	-.47	-.57
11. We decide as a team who will do what in the team (aut1)	3.15	1.08	-.82	-.12
12. We are free to decide how to carry out the team's tasks (aut2)	3.24	1.02	-.64	-.22
13. In this team we set our own goals (aut3)	3.08	1.04	-.78	-.05
14. We are formally recognised as a team within our organisation (bou1)	3.95	.99	.98	-1.11
15. It is clear who the members of our team are (bou2)	4.22	.82	1.78	-1.19
16. Members are clear about their own role within the team (rol1)	3.82	.89	.38	-.78
17. Members are clear about the roles of other team members (rol2)	3.56	1.02	-.53	-.46

**Table C.12: Correlation matrix for 17-item scale (sample 2)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. In this team we know what we are trying to achieve (ob1)																	
2. Team members are committed to achieving the team's objectives (ob2)	.69**																
3. We agree in the team about what our team objectives are (ob3)	.67**	.67**															
4. In this team we have a shared purpose (ob4)	.66**	.67**	.67**														
5. We regularly discuss whether the team is working effectively together (ref1)	.47**	.46**	.55**	.54**													
6. The team often reviews its objectives (ref2)	.54**	.51**	.58**	.56**	.71**												
7. We regularly reflect upon team performance and how it could be improved (ref3)	.47**	.49**	.55**	.54**	.74**	.72**											
8. We have to coordinate our work tightly in this team (int1)	.46**	.45**	.49**	.51**	.44**	.45**	.48**										

9. Members of my team have to communicate closely with each other to get the job done (int2)	.41**	.35**	.43**	.50**	.38**	.36**	.42**	.65**									
	635	636	636	636	635	636	634	633									
10. The team task cannot be achieved without the contribution of every team member (int3)	.37**	.28**	.36**	.38**	.35**	.32**	.35**	.45**	.43**								
	636	637	637	637	636	637	635	634	637								
11. We decide as a team who will do what in the team (aut1)	.38**	.39**	.45**	.41**	.43**	.40**	.44**	.40**	.36**	.34**							
	634	635	635	635	634	635	633	632	635	636							
12. We are free to decide how to carry out the team's tasks (aut2)	.27**	.28**	.32**	.60**	.23**	.25**	.19**	.26**	.26**	.20**	.49**						
	635	636	636	636	635	636	634	633	636	637	635						
13. In this team we set our own goals (aut3)	.23**	.24**	.33**	.26**	.27**	.27**	.24**	.28**	.25**	.20**	.45**	.58**					
	634	635	635	635	634	635	633	632	635	636	634	635					
14. We are formally recognised as a team within our organisation (bou1)	.29**	.29**	.27**	.31**	.25**	.27**	.27**	.27**	.26**	.24**	.22**	.14**	.17**				
	634	636	635	635	634	635	633	632	635	636	634	635	634				
15. It is clear who the members of our team are (bou2)	.43**	.41**	.37**	.45**	.40**	.40**	.35**	.39**	.40**	.33**	.33**	.22**	.23**	.48**			
	636	637	637	637	636	637	635	632	637	638	636	637	636	636			
16. Members are clear about their own role within the team (rol1)	.51**	.49**	.47**	.50**	.39**	.46**	.38**	.36**	.30**	.23**	.34**	.21**	.22**	.33**	.42**		
	635	636	636	636	635	636	634	633	636	637	635	636	635	635	637		
17. Members are clear about the roles of other team members (rol2)	.52**	.53**	.50**	.52**	.42**	.48**	.42**	.45**	.35**	.31**	.46**	.28**	.27**	.37**	.49**	.72**	
	635	636	636	636	635	636	634	633	636	637	635	636	635	635	637	636	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table C.13: Item mean, standard deviation, kurtosis and skewness (sample 3, time 1)**

	Mean	S.D	Kurtosis	Skewness
1 Team members are committed to achieving the team's objectives (ob2)	4.07	.88	1.01	-1.00
2 We agree in the team about what our team objectives are (ob3)	3.96	.81	.65	-.70
3 The team often reviews its objectives (ref2)	3.33	.93	-.40	-.13
4 We regularly reflect upon team performance and how it could be improved (ref3)	3.28	.93	-.31	-.14
5 We have to coordinate our work tightly in this team (int1)	3.66	.86	.37	-.51
6 Members of my team have to communicate closely with each other to get the job done (int2)	3.61	.95	-.38	-.43
7 We are free to decide how to carry out the team's tasks (aut2)	3.78	.82	.92	-.72
8 In this team we set our own goals (aut3)	3.42	.92	-.36	-.28
9 We are formally recognised as a team within our organisation (bou1)	3.71	.85	-.06	-.26
10 It is clear who the members of our team are (bou2)	4.39	.73	1.48	-1.16
11 Members are clear about their own role within the team (rol1)	3.53	.97	-.14	-.44
12 Members are clear about the roles of other team members (rol2)	3.38	.95	-.07	-.21

**Table C.14: Item mean, standard deviation, kurtosis and skewness (sample 3, time 2)**

	<b>Mean</b>	<b>S.D</b>	<b>Kurtosis</b>	<b>Skewness</b>
1 Team members are committed to achieving the team's objectives (ob2)	3.94	.85	.73	-.78
2 We agree in the team about what our team objectives are (ob3)	3.92	.78	.76	-.72
3 The team often reviews its objectives (ref2)	3.39	.98	-.60	-.18
4 We regularly reflect upon team performance and how it could be improved (ref3)	3.38	.93	-.76	-.14
5 We have to coordinate our work tightly in this team (int1)	3.75	.78	-.40	-.15
6 Members of my team have to communicate closely with each other to get the job done (int2)	3.77	.78	.21	-.45
7 We are free to decide how to carry out the team's tasks (aut2)	3.68	.85	-.02	-.45
8 In this team we set our own goals (aut3)	3.37	.93	-.52	-.20
9 We are formally recognised as a team within our organisation (bou1)	3.80	.88	-.21	-.41
10 It is clear who the members of our team are (bou2)	4.28	.80	1.20	-1.10
11 Members are clear about their own role within the team (rol1)	3.77	.92	.24	-.66
12 Members are clear about the roles of other team members (rol2)	3.76	.89	-.08	-.44

**Table C.15: Item mean, standard deviation, kurtosis and skewness (sample 3, time 3)**

	<b>Mean</b>	<b>S.D</b>	<b>Kurtosis</b>	<b>Skewness</b>
1 Team members are committed to achieving the team's objectives (ob2)	3.90	.94	.79	-.91
2 We agree in the team about what our team objectives are (ob3)	3.93	.85	1.25	-.95
3 The team often reviews its objectives (ref2)	3.44	.99	-.45	-.33
4 We regularly reflect upon team performance and how it could be improved (ref3)	3.43	1.06	-.57	-.35
5 We have to coordinate our work tightly in this team (int1)	3.66	.80	-.02	-.39
6 Members of my team have to communicate closely with each other to get the job done (int2)	3.77	.90	-.01	-.63
7 We are free to decide how to carry out the team's tasks (aut2)	3.63	.81	.40	-.64
8 In this team we set our own goals (aut3)	3.43	.96	-.66	-.28
9 We are formally recognised as a team within our organisation (bou1)	3.87	.93	.51	-.77
10 It is clear who the members of our team are (bou2)	4.22	.79	1.95	-1.18
11 Members are clear about their own role within the team (rol1)	3.78	.97	.27	-.77
12 Members are clear about the roles of other team members (rol2)	3.81	.96	.30	-.79

**Table C.16: Correlation matrix for 12-item scale (sample 3, time 1)**

	1	2	3	4	5	6	7	8	9	10	11	12
1. Team members are committed to achieving the team's objectives (ob2)												
2. We agree in the team about what our team objectives are (ob3)	.55**											
3. The team often reviews its objectives (ref2)	.40**	.52**										
4. We regularly reflect upon team performance and how it could be improved (ref3)	.17**	.35**	.49**									
5. We have to coordinate our work tightly in this team (int1)	.11	.19**	.21**	.42**								
6. Members of my team have to communicate closely with each other to get the job done (int2)	.01	.06	.12*	.29**	.42**							
7. We are free to decide how to carry out the team's tasks (aut2)	.19**	.31**	.20**	.13*	.13*	.10						
8. In this team we set our own goals (aut3)	.09	.19**	.13*	.07	.04	.06	.38**					
9. We are formally recognised as a team within our organisation (bou1)	.19**	.23**	.10	.10	.13*	.14*	.15**	.11				
10. It is clear who the members of our team are (bou2)	.26**	.26**	.16**	.07	.12*	.03	.20**	.17*	.35**			
11. Members are clear about their own role within the team (rol1)	.53**	.47**	.39**	.218**	.11	.06	.23**	.12**	.25**	.30**		
12. Members are clear about the roles of other team members (rol2)	.32**	.35**	.27**	.20**	.08*	-.01	.20**	.15**	.22**	.21**	.69**	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table C.17: Correlation matrix for 12-item scale (sample 3, time 2)**

	1	2	3	4	5	6	7	8	9	10	11	12
1. Team members are committed to achieving the team's objectives (ob2)												
2. We agree in the team about what our team objectives are (ob3)	.65**											
3. The team often reviews its objectives (ref2)	.49**	.55**										
4. We regularly reflect upon team performance and how it could be improved (ref3)	.38**	.43**	.52**									
5. We have to coordinate our work tightly in this team (int1)	.17**	.16**	.17**	.32**								
6. Members of my team have to communicate closely with each other to get the job done (int2)	.15**	.16**	.08	.21**	.50**							
7. We are free to decide how to carry out the team's tasks (aut2)	.20**	.21**	.22**	.23**	.14**	.26**						
8. In this team we set our own goals (aut3)	.25**	.30**	.30**	.31**	.20**	.09	.27**					
9. We are formally recognised as a team within our organisation (bou1)	.33**	.35**	.25**	.34**	.21**	.18**	.22**	.24**				
10. It is clear who the members of our team are (bou2)	.30**	.29**	.19**	.27**	.14*	.15**	.20**	.15**	.49**			
11. Members are clear about their own role within the team (rol1)	.52**	.42**	.38**	.37**	.18**	.14*	.21**	.15**	.32**	.41**		
12. Members are clear about the roles of other team members (rol2)	.40**	.38**	.39**	.41**	.20**	.11	.27**	.19**	.31**	.48**	.82**	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Table C.18: Correlation matrix for 12-item scale (sample 3, time 3)**

	1	2	3	4	5	6	7	8	9	10	11	12
1. Team members are committed to achieving the team's objectives (ob2)												
2. We agree in the team about what our team objectives are (ob3)	.66**											
3. The team often reviews its objectives (ref2)	.59**	.65**										
4. We regularly reflect upon team performance and how it could be improved (ref3)	.50**	.56**	.65**									
5. We have to coordinate our work tightly in this team (int1)	.23**	.25**	.26**	.32**								
6. Members of my team have to communicate closely with each other to get the job done (int2)	.16**	.17**	.13*	.21**	.51**							
7. We are free to decide how to carry out the team's tasks (aut2)	.28**	.27**	.24**	.28**	.17**	.23**						
8. In this team we set our own goals (aut3)	.26**	.25**	.23**	.23**	.24**	.17**	.46**					
9. We are formally recognised as a team within our organisation (bou1)	.42**	.45**	.39**	.40**	.27**	.31**	.30**	.37**				
10. It is clear who the members of our team are (bou2)	.39**	.44**	.32**	.33**	.17**	.22**	.20**	.19**	.55**			
11. Members are clear about their own role within the team (rol1)	.56**	.61**	.56**	.45**	.12*	.09	.30**	.24**	.40**	.45**		
12. Members are clear about the roles of other team members (rol2)	.49**	.57**	.53**	.43**	.16**	.10	.28**	.23**	.43**	.38**	.86**	

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

## Appendix C.5: Factor loadings table across all samples

Table C.19: Factor loadings table (all samples)

	EFA (sample 1)	EFA (sample 2)	CFA (time 1, sample 2)	CFA (time 2, sample 2)	CFA (time 1, sample 3)	CFA (time 2, sample 3)	CFA (time 3, sample 3)
1. In this team we know what we are trying to achieve (ob1)	.60	.78	.80	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
2. Team members are committed to achieving the team's objectives (ob2)	.78	.76	.79	.82	.70	.79	.78
3. We agree in the team about what our team objectives are (ob3)	.68	.82	.80	.85	.78	.82	.85
4. In this team we have a shared purpose (ob4)	.66	.81	.88	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
5. We regularly discuss whether the team is working effectively together (ref1)	.62	.65	.86	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
6. The team often reviews its objectives (ref2)	.63	.70	.86	.86	.89	.74	.86
7. We regularly reflect upon team performance and how it could be improved (ref3)	.57	.66	.86	.82	.55	.71	.76
8. We have to coordinate our work tightly in this team (int1)	.48	.74	.86	.82	.98	.80	.84
9. Members of my team have to communicate closely with each other to get the job done (int2)	.36	.63	.79	.74	.43	.62	.61
10. The team task cannot be achieved without the contribution of every team member (int3)	.40	.52	.57	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
11. We decide as a team who will do what in the team (aut1)	.62	.61	.57	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
12. We are free to decide how to carry out the team's tasks (aut2)	.37	.41	.76	.90	.80	.48	.70
13. In this team we set our own goals (aut3)	.27	.45	.80	.68	.48	.56	.66
14. We are formally recognised as a team within our organisation (bou1)	.57	.41	.63	.53	.54	.73	.78
15. It is clear who the members of our team are (bou2)	.47	.57	.84	.81	.65	.68	.71

16. Members are clear about their own role within the team (rol1)	.58	.60	.80	.81	.99	.92	.96
17. Members are clear about the roles of other team members (rol2)	.49	.69	.86	.89	.70	.89	.89

## Appendix C.6: Path diagrams for second order real team model (sample 3)

Figure C.1: Path diagram - time 1 (sample 3)

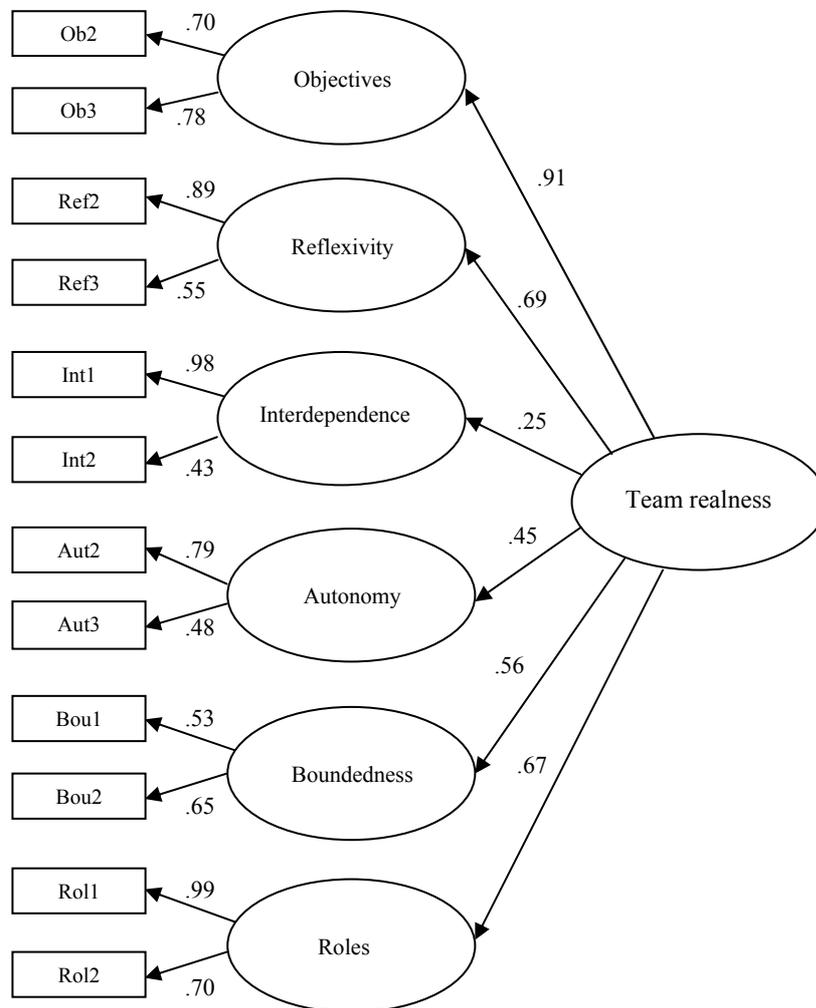


Figure C.2: Path diagram - time 2 (sample 3)

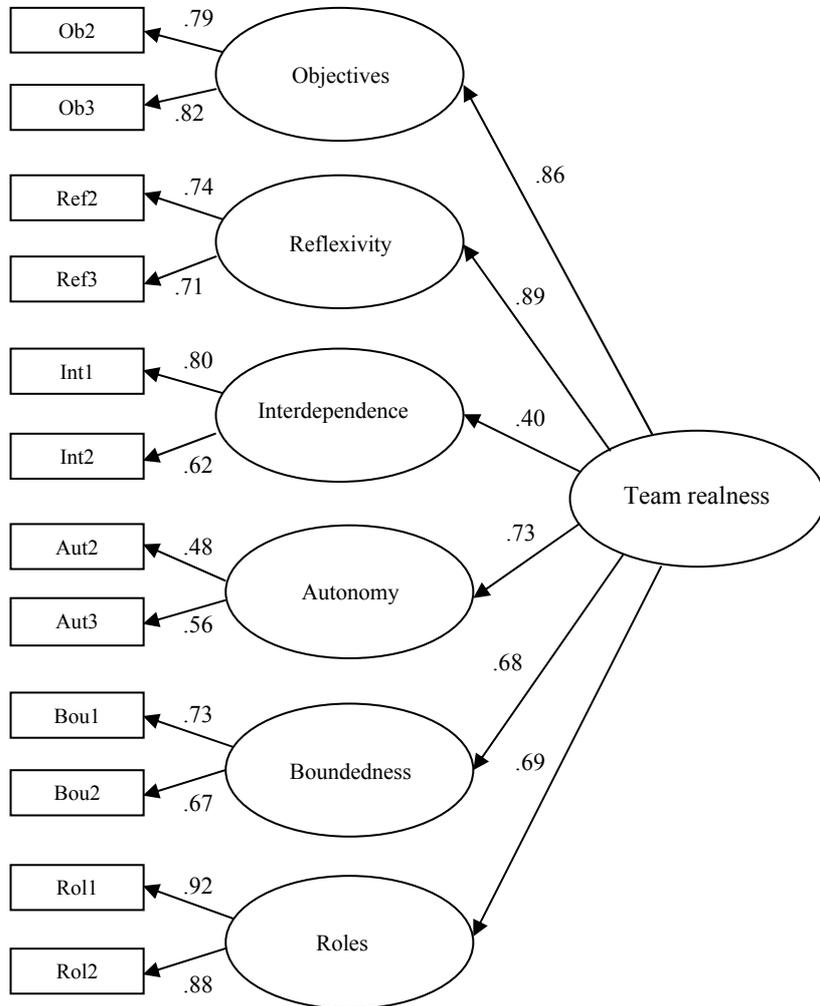
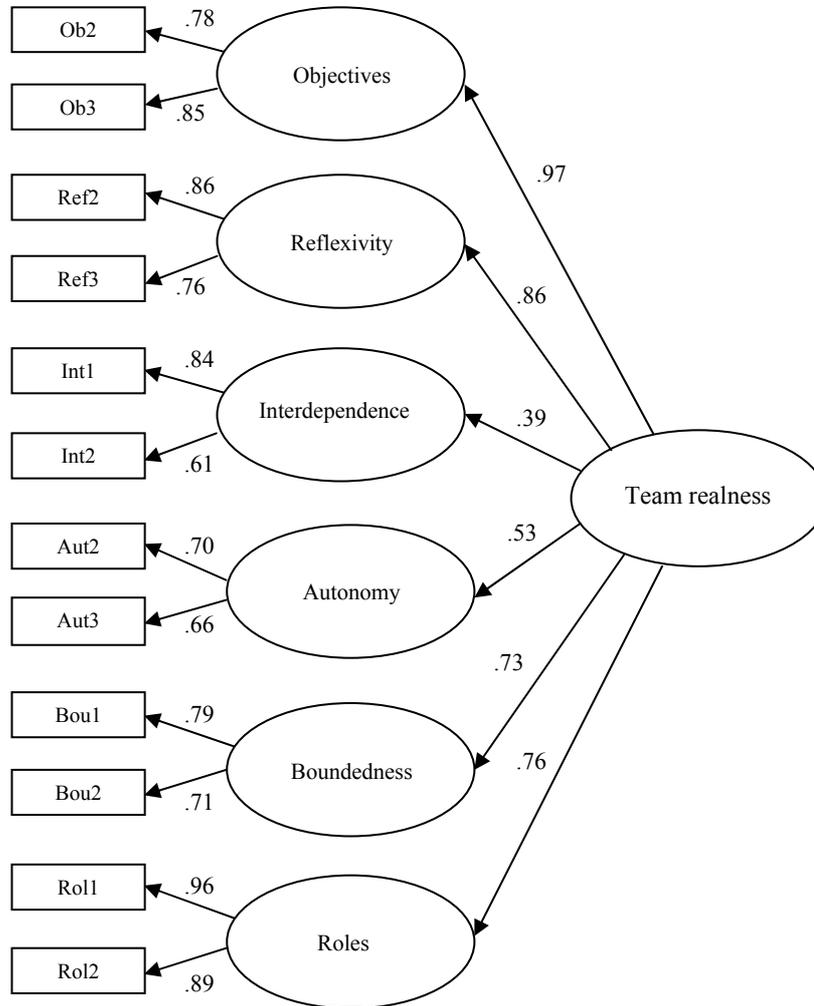


Figure C.3: Path diagram - time 3 (sample 3)



## APPENDIX D:

### Appendix D.1: Consensual and discriminant validity for additional variables

**Table D.20: Self-validation items (sample 1) - consensual and discriminant validity**

	<i>Rwg(j)</i>	ICC1	ICC2	<i>F-Value</i>
1. How often do people outside of the team set your team objectives? ( <i>autonomy</i> )	.78	-0.032	-0.116	.89
2. How often do people outside of the team decide who will do what in the team? ( <i>autonomy</i> )	.89	-0.063	-0.260	.79
3. How often do people outside of the team decide how you will carry out team tasks? ( <i>autonomy</i> )	.89	-0.055	-0.218	.82
4. How often do you have to work with other members of your team to complete the team's task? ( <i>interdependence</i> )	.83	0.007	0.026	1.02
5. The team has about the right number of people to do the task well. ( <i>interdependence</i> )	.97	0.066	0.179	1.22
6. How many of the other members of your team do you have to regularly work closely with in order to complete your team task? ( <i>interdependence</i> )	.63	0.058	0.179	1.95**
7. In the box below please indicate how many times your team meets in an average month ( <i>reflexivity</i> )	n/a	0.128	0.332	1.50*
8. The team holds meeting regularly enough in order to do the task well ( <i>reflexivity</i> )	1.27	0.121	0.328	1.49*
9. Since the beginning of the business game module, have the team's main objectives changed? ( <i>reflexivity</i> )	.77	0.126	0.328	1.35
10. Since the beginning of the business game module, have the methods used by the team to get the job done changed? ( <i>reflexivity</i> )	.80	0.190	0.442	1.79**

Sample 1 = 54 teams; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

**Table D.21: Team satisfaction (sample 1) - consensual and discriminant validity**

	<i>Rwg(j)</i>	ICC1	ICC2	<i>F-Value</i>
<b>Team satisfaction</b>	0.70	0.25	0.53	2.16***

Sample 1 = 54 teams; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

**Table D.22: Self-validation items (sample 2) - consensual and discriminant validity**

	<i>Rwg(j)</i>	ICC1	ICC2	<i>F-Value</i>
1. How often do people outside of the team set your team objectives? ( <i>autonomy</i> )	0.76	0.09	0.47	0.88***
2. How often do people outside of the team decide who will do what in the team? ( <i>autonomy</i> )	0.80	0.07	0.41	1.69**
3. How often do people outside of the team decide how you will carry out team tasks? ( <i>autonomy</i> )	0.77	0.14	0.58	2.40***
4. How often have you had to work with other members of your team in order for the team to accomplish its goals and responsibilities ( <i>interdependence</i> )	0.62	0.09	0.45	1.82***
5. How often have other members of your team had to work together in order for the team to accomplish its goals and responsibilities ( <i>interdependence</i> )	.069	0.13	0.55	2.24***
6. Has the team discussed whether it is meeting its objectives? ( <i>reflexivity</i> )	0.55	0.14	0.60	2.43***
7. Have the team's main objectives changed? ( <i>reflexivity</i> )	0.53	0.24	0.73	3.69***
8. Have the methods used by the team to get the job done changed? ( <i>reflexivity</i> )	0.58	0.19	0.67	3.02***

Sample 2 = 63 teams; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

**Table D.23: Team satisfaction (sample 2) - consensual and discriminant validity**

	<i>Rwg(j)</i>	ICC1	ICC2	<i>F-Value</i>
<b>Team satisfaction</b>	.77	.26	.75	3.94***

Sample 2 = 63 teams; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

## Appendix D.2: Behavioural observational scales

### Behavioural Observation Scale for Shared Objectives

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

#### Definition:

Team goal orientation refers to the extent to which team members are committed to achieving clear shared team level objectives, upon which team members agree. Teams with high levels of goal orientation have a clear idea of what they are trying to achieve, discussing a shared vision upon which all team members agree, and are dedicated to working towards. Conversely, teams with low levels of goal orientation are unclear as to what the teams main objectives are, and/or find it difficult to agree upon a shared purpose. As a result, team members demonstrate little commitment towards achieving team level objectives, and may appear more interested in pursuing their own individual goals.

#### *Clarity and Sharedness of Team Objectives*

This Team:

- 1) \_\_\_\_\_ demonstrates a clear understanding of what it needs to achieve in the next business game practical session and/or in the group report.
- 2) \_\_\_\_\_ appears confident about the sorts of tasks it needs to carry out in order to meet team objectives, discussing a time frame for completing the work.
- 3) \_\_\_\_\_ recognises the need to set goals for next business game practical session and/or the group report, but decisions are left 'up in the air'.
- 4) \_\_\_\_\_ appears unclear about what it wants to achieve in the remainder of the business game module, with team members expressing signs of confusion and/or bewilderment about their task(s).

Comments:

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**Agreement upon Team Objectives**

This Team:

- 5) \_\_\_\_\_ demonstrates clear consensus over team goals and objectives, with team members seeking confirmation about what the team has decided to aim for in the business game practical session and/or the group report.
- 6) \_\_\_\_\_ backs-up team member suggestions regarding what the team's objectives should be, signalling confirmation and agreement.
- 7) \_\_\_\_\_ shows disagreement amongst team member's opinions and suggestions about team goals.
- 8) \_\_\_\_\_ fails to reach a consensus at the end of the team meeting over what needs to be achieved in the future.

Comments:

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**Commitment to Team Objectives**

This Team:

- 9) \_\_\_\_\_ appears to be committed to achieving the team's objectives for the business game module.
- 10) \_\_\_\_\_ fully participates in discussing how the team objectives can be achieved in the practical session(s) and/or group report, with all team members offering suggestions on how they can contribute to task completion.
- 11) \_\_\_\_\_ does not appear to care about whether it will meet its goals for the business game simulation and/or the group report.
- 12) \_\_\_\_\_ engages in discussion that has no relevance to what needs to be achieved in business game simulation and/or the group report.

Comments:

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### Behavioural Observation Scale for Team Reflexivity

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

**Definition:**

Team reflexivity refers to the extent to which a team overtly and collectively reflects upon their immediate and long term objectives, processes and strategies and adapts them to current or anticipated circumstances. A highly reflexive team is one which communicates regularly in order to reflect upon the team's effectiveness and performance and discuss ways in which it could be improved. Team reflection includes behaviours such as questioning, planning, analysis, exploration, making use of knowledge explicitly, reviewing past events with self-awareness, and learning in order to come to terms with a new awareness about the team and its circumstances. A team that is low in reflexivity will demonstrate a low level of self-awareness and is unlikely to discuss the effectiveness of their team, or their past performance. Further, the team is unlikely to discuss the current appropriateness of their team objectives.

This Team:

- 1) \_\_\_\_\_ spends time talking about what happened in the previous practical session(s) and/or the business plan, reflecting on their own performance and comparing it to other business game teams.
- 2) \_\_\_\_\_ after some reflection on previous performance (either in the business game simulation or in coursework assignments), the team talks about ways in which it might have done things differently, and how it plans to improve performance in the future.
- 3) \_\_\_\_\_ re-assesses and adjusts its performance goals in light of new circumstances (*for example; the provision of new information on the coursework assignment, or a change in position of the winning teams in the business game simulation*).
- 4) \_\_\_\_\_ does not spend any time recalling and discussing their performance on business game coursework.
- 5) \_\_\_\_\_ does not spend any time recalling and discussing previous events in practical sessions, or information provided tutorial sessions.
- 6) \_\_\_\_\_ makes no suggestions on how they might improve their team processes and/or effectiveness for the remainder of the module.

Comments:

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### Behavioural Observation Scale for Team Interdependence

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

**Definition:**

Team interdependence refers to the extent to which team members are reliant on one another in order to achieve team tasks, goals and outcomes. Highly interdependent teams are those in which members have to co-ordinate their work closely in order to achieve the teams shared objectives. Very often, in such teams, the team task cannot be successfully achieved without the contribution of every team member. Therefore, close communication between team members, which involves the co-ordinated exchange of sub-sections of work, knowledge and information is commonplace in highly interdependent teams. Conversely, in team with low levels of interdependence, team members can often work in isolation, with little need to discuss their work with their teammates.

This Team:

- 1) \_\_\_\_\_ appears to depend on particular members for completing particular tasks in relation to the business game. *For example, questions are directed towards the finance directors when the financial status of the company is discussed.*
  
- 2) \_\_\_\_\_ discusses specific tasks and roles that must be fulfilled by missing members (who are absent from the meeting), in order for the team to complete their overall task(s).
  
- 3) \_\_\_\_\_ demonstrates effective co-ordination, whereby team members successfully combine their knowledge, skills and resources in working towards the group assignment and/or making decisions for the next practical session.
  
- 4) \_\_\_\_\_ is less concerned about their performance in the business game simulation and/or group assignment, but is more interested in the individual essay task.
  
- 5) \_\_\_\_\_ does not appear to require help, assistance or information from specific team members about the business game simulation, or the group coursework.
  
- 6) \_\_\_\_\_ is comprised of members who appear to be pursuing their own individual goals, and do not express any interest in the work progress of their teammates.

Comments:

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### Behavioural Observation Scale for Team Autonomy

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

#### Definition:

Team autonomy is defined as the amount of control and discretion a team perceives that it has in carrying out tasks assigned by their organisation. Teams with high levels of autonomy are often described as owning their task, as decisions about setting team goals, deciding how to carry out a task, and deciding who should do what in the team is larger up to the team itself. Teams with high levels of autonomy are empowered to determine their own course of action by making their own decisions, based on the information that is available to them. Conversely, teams with low levels of autonomy are likely to demonstrate a poor orientation towards making decisions about the future strategy of their work. They may prefer to consult outside sources (e.g. managers or other teams) to discuss a course of action.

This Team:

- 1) \_\_\_\_\_ appears confident in setting its own tasks and goals.
- 2) \_\_\_\_\_ perceives itself as autonomous, demonstrating an ability to choose how to carry out their work and adapt their processes without consulting anyone from outside of the team.
- 3) \_\_\_\_\_ decides how to do their own work and appear to 'own their task'.
- 4) \_\_\_\_\_ appears unable to confidently determine its own course of action.
- 5) \_\_\_\_\_ fails to come to any firm decisions, discussing the need to check with their business game tutor and/or other business game teams over what they can and can't do.
- 6) \_\_\_\_\_ seems to be unclear about what they can and can't do in relation to the business game simulation and/or the group coursework.

Comments:

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### Behavioural Observation Scale for Specified Team Roles

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

#### Definition:

Team roles define the specific position that an individual should occupy within the team. When team roles are clear and distinguishable, each team member has a clear idea of the tasks that they must carry out in order to contribute towards achieving the overall team goal. Clear team roles help to guide expected behaviour within the team. Further, team members also understand what the roles of their fellow team members are, and generally what is involved in carrying out their sub-tasks. Conversely, in teams which have poor levels of role clarity, team members do not clearly understand what is required of them, and may not understand the sort of work their teammates carry out in order to contribute to the overall team objective. Such teams are likely to demonstrate 'diffusion of responsibility', whereby no one steps forward to accept accountability for a given task or outcome.

This Team:

- 1) \_\_\_\_\_ is clear about who does what in the team (i.e. who is managing director, who financial director etc.)
- 2) \_\_\_\_\_ directs specific questions and suggestions towards particular team members, who appear to have the respective role within the team.
- 3) \_\_\_\_\_ seems unclear about who has the role of each director.
- 4) \_\_\_\_\_ struggles to identify team members to step forward to accept responsibility for a particular task or outcome.

Comments:

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### Behavioural Observation Scale for Team Boundedness

Almost never		Sometimes		Almost Always
1	2	3	4	5

Write "N/A" if a behaviour does not apply

**Definition:**

Team boundedness refers to the extent to which team membership is clear and bounded within the context in which it exists. Highly bounded teams are those which are clearly recognised as a team within a wider organisation by those who do not belong to the team. Such teams have a strong team identity and sense of belonging to their team within their work environment. Further, individuals in highly bounded teams can clearly distinguish between exactly who is in the team, and who is not. Individuals in poorly bounded teams however will struggle to identify who belongs to their team, and there may be disagreements about team membership between teammates. Not only is team membership ambiguous, but poorly bounded teams are unlikely to be recognised as a team by people within their wider work environment.

This Team:

- 1) \_\_\_\_\_ appears to have a strong team identity. *(For example, the team frequently uses terms like 'we' when referring to the team, and 'us and them' when talking about other business game teams.)*
- 2) \_\_\_\_\_ frequently using their company name to describe themselves.
- 3) \_\_\_\_\_ have a clear idea about who belongs on the team – even if some team members are absent from the meeting.
- 4) \_\_\_\_\_ shows confusion about team membership; whereby members are not clear about who belongs to the team, and who does not.

Comments:

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## Appendix D.3: Team member consent form



### Facilitating Collaboration within Teams

Dear Student,

I would like to invite your Business game Team to participate in a piece of research which is to be conducted by a member the Work and Organisational Psychology department at Aston Business School over the next three weeks. The purpose of the research is to develop a new tool to measure the quality of teamwork interactions.

#### *What's involved?*

Firstly, we would like participants to complete a short survey about your views about your work within your Business game team during the past 5 months. All students on the Business game Module will be invited to complete the questionnaire via e-mail, which you were sent via e-mail. Secondly, we would like to invite around 30 teams to volunteer to have one of their team meetings tape recorded. The researcher will not be present during the meeting; she will simply leave a tape recording device with each team and collect it at the end of the meeting.

Please be aware that participation in this research will have no effect on your performance or mark in the Business game Module (BS2225) and that there are no penalties for non-participation. All data will be stored in accordance with the Data Protection Act (1998) and the confidentiality of your data will be maintained at all times. All tape recordings of team meetings will be transcribed by the researcher, ensuring that any information that may make participants identifiable is anonymised. A small team of subject matter experts from within Aston Business School will then assist the researcher in the analysis of the data. Please be aware that you have the right to withdraw from the research at any time and that there are no adverse consequences for withdrawal.

#### *What are the benefits?*

By participating in the questionnaire aspect of the research, you will be automatically entered into a prize draw on 1<sup>st</sup> May 2008 to win a Nintendo Wii or one of two iPod Nanos. At the end of the Business game module, participating teams will also be able to request a team feedback report identifying key themes in your teamwork interactions and suggesting areas for improvement in the future. This provides an excellent and free opportunity to develop your team work skills for your future career. Note that in the reports, individual responses will not be identifiable, thus protecting your *anonymity and confidentiality*. Further, the reports will not be distributed elsewhere.

Your participation will provide data for the PhD thesis of the researcher, Joanne Richardson, and anonymous aggregated results may be published in academic journals. Therefore, your participation in this research would be greatly appreciated and will form a valuable contribution towards improving our understanding about team effectiveness. If you are happy to participate, please complete the attached form and the researcher will contact you to make arrangements.

Any further questions, please don't hesitate to e-mail Joanne at [richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk) or telephone 0121 2043315

Kind Regards,

Joanne Richardson

## Consent Form

### Participant's Statement

In relation to the 'Facilitating Collaboration within Teams' study, I have been fully informed, in writing, about the purpose of the study and exactly what is required in order to participate. I have read and fully understood the covering sheet to this consent form and agree to participate in a tape recorded meeting with my Business game team members.

### Named Researcher

Joanne Richardson,  
Doctoral Researcher,  
Work and Organisational Psychology Group,  
Room 8<sup>th</sup> Floor, South Wing,  
Aston Business School,  
richarj2@aston.ac.uk  
Tel: 0121 204 3315

Signature:	
Full Name:	<i>(Please do not give your Student Candidate Number on this document)</i>
Team Name:	
Date:	

**Thank you for your participation in this research**

## **Appendix D.4: Instructions for expert raters**

### **Validation of a Teamwork Scale: Information for Raters**

#### **Aim**

The overall aim of exercise is to validate a new scale on team work. The scale consists of around 17 survey items which were incorporated into a questionnaire and used to collect data from a large number of undergraduate student teams which were all taking part in the 'Business game' module. Some of the participating teams also allowed the researcher to record them while they were holding a typical team meeting. For the purposes of this exercise, the team meetings transcripts will be examined to help us to establish the criterion validity of the new scale, and ensure that it is actually measuring what it claims to measure.

#### **What is the Business game?**

The Business game is a year-long business simulation exercise which requires students to work in team. Each team consists of four or five individuals who work together to form an independent car manufacturing organisation. Each team member is assigned one of five roles; Managing Director, Finance Director, HR Director, Marketing Director or Operations Director. In the instance of a team of four, the HR and Operations Director are typically combined to form a shared role. During several practical sessions, the teams compete with one another in a virtual business simulation. Over a year long period, each team's performance on the simulation can be monitored and reliably compared to the other teams in the Business game. Between each practical session, the teams meet together in tutorial sessions, where they can discuss their progress with their Business game tutor. In their own time, the teams are also encouraged to hold regular meetings, although it is not specified when or where they should meet, or what they should discuss - this is left up to the team.

During the module, not only are the teams assessed on their performance in the practical sessions, they also have to give a formal presentation at the beginning of the year, as well as submit a number of assignments. These pieces of coursework include an individual essay, as well as two group assignments – the business plan and a final report. At the point of these team meeting recordings, all teams had already given their formal presentation and have submitted their business plan. However, the group report and individual essay were both due for submission in the coming weeks.

In order to contextualise the general content of the meeting transcripts, the teams tend to be talking about one or two key tasks:

Firstly, the teams commonly discuss aspects relating to the practical sessions, such as discussing their previous performance, their competing teams within the tutorial group, and new strategies or challenges that they are currently facing.

Secondly, the teams commonly discuss aspects relating to their pending assignments – the group report, and the individual essay. The group report is a short assignment which requires a contribution from every team member. The individual report is a much longer essay which team members must complete independently. In some of the team meeting transcripts, you may notice that the coursework assignment guidelines are recited by team members. These guidelines have been attached to these instructions, and will help you to distinguish between the teams 'natural talk' and the reciting of the coursework instructions (which appear in speech marks on the transcripts). Please do not directly code these phrases, but consider how this sort of team behaviour might reflect the dimension(s) that you are coding for.

#### **Specific terminology**

Given that all of these meeting transcripts are bounded in the context of the Business game, it is important to clarify any context-specific terminology which you may come across whilst reading the transcripts. Some basic principles about the simulation are also covered:

'Cycle(s)' – the Business game Simulation occurs over a hypothetical three year period. This three year period is covered over the course of six practical sessions (often referred to as '*simulations*'). During each of these sessions, the teams compete on a week-by-week basis, and each week is commonly referred to as a 'cycle'

There are five types of cars that the teams can choose manufacture;

- *super-mini*
- *lower-medium*
- *upper-medium*
- *lower luxury*
- *minivan compact*

There are five markets which the teams can choose to sell in;

- *UK*
- *Germany*
- *France*
- *Italy*
- *Spain*

In order to produce their cars, teams must take out a loan in order to purchase a number of things;

- *Factories* (these could be built in any of the five locations above)
- *Production lines* (often just referred to as 'lines')
- *Steel* (often purchased as part of a steel contract)
- *Robots* (to improve production capacity)
- *Staff to work on the production lines* (which must be trained and paid wages)
- *Research and Development (R&D)* projects
- *Promotion* (via a number of methods such as TV, cinema, outdoor or radio)

## **Instructions**

Looking at the Behavioural Observation Scale sheet, please carefully read through the definition of the team construct that you are about to rate, asking the researcher for any clarification you require. Also, please read through the list of items below the definition, ensuring that you fully understand the meaning of each.

Then please proceed to read through each team meeting transcript carefully with the item list in mind, highlighting *every* part of the transcript which you feel represents an example of this team construct/item in action. Once you have finished the transcript, please respond to each item on the five point scale, by writing down the relevant number in the space provided. Only write N/A if you *really* can't make a decision about the item due to lack of evidence in the transcript.

Please note that at various stages throughout the coding process, your responses will be compared with those of your coding partner, in order to establish a high level of agreement, thus ensuring inter-rater reliability. Finally, please be aware that all of your responses will be treated with the upmost anonymity and confidentiality, and you have the right to withdraw from the exercise at any time. You can contact the researcher, Joanne Richardson, at [richarj2@aston.ac.uk](mailto:richarj2@aston.ac.uk) if you have any questions or queries.