WORK STRESSORS, STRAINS AND HOSPITAL UNIT PERFORMANCE

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THESIS SUMMARY

Hospital employees who work in an environment with zero tolerance to error, face several stressors that may result in psychological, physiological, and behavioural strains, and subsequently, in suboptimal performance. This thesis includes two studies which investigate the stressor-to-strain-to-performance relationships in hospitals.

The first study is a cross-sectional, multi-group investigation based on secondary data from 65,142 respondents in 172 acute/specialist UK NHS trusts. This model proposes that senior management leadership predicts social support and job design which, in turn, moderate stressors-to-strains across team structure. The results confirm the model's robustness. Regression analysis provides support for main effects and minimal support for moderation hypotheses. Therefore, based on its conclusions and inherent limitations, study one lays the framework for study two.

The second study is a cross-sectional, multilevel investigation of the strain-reducing effects of social environment on externally-rated unit-level performance based on primary data from 1,137 employees in 136 units, in a hospital in Malta. The term "social environment" refers to the prediction of the moderator variables, which is to say, social support and decision latitude/control, by transformational leadership and team climate across hospital units. This study demonstrates that transformational leadership is positively associated with social support, whereas team climate is positively associated with both moderators. At the same time, it identifies a number of moderating effects which social support and decision latitude/control, both separately and together, had on specific stressor-to-strain relationships. The results show significant mediated stressor-to-strain-to-performance relationships. Furthermore, at the higher level, unit-level performance is positively associated with shared unit-level team climate and with unit-level *vision*, the latter being one of the five sub-dimensions of transformational leadership. At the same time, performance is also positively related to both transformational leadership and team climate when the two constructs are tested together.

Few studies have linked the buffering effects of the social environment in occupational stress with performance. Therefore, this research strives to make a significant contribution to the occupational stress and performance literature with a focus on hospital practice. Indeed, the study highlights the wide-ranging and far-reaching implications that these findings provide for theory, management, and practice.

Keywords: Decision latitude/control, Hospitals, Mediation, Moderation, Multigroup, Multilevel, Occupational Stress, Performance, Social environment, Social support, Structural equation modelling, Teams, Transformational leadership.

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WORK IN PROGRESS AND PRESENTATIONS RESULTING FROM THIS WORK

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PRESENTATIONS

Buttigieg, A.C. (2000). Teamwork and Training of Health Care Professionals. Symposium on Bioethics, St James Cavalier, Valletta, Malta.

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CHAPTER ONE
INTRODUCTION

1.1 General Introduction

It is well recognised that health professionals in secondary health care face a multitude of stressors during their working life. Amongst those reported in the literature are work demands and workload, time pressures, organisational constraints, organisational changes, interprofessional and interpersonal conflicts, incidents and accidents at work, enclosed atmosphere, litigation, as well as the experience of suffering, grief, and death. Similarly, health care researchers report psychological, physiological, and behavioural changes in health care providers as consequences of work-related activities (Cox, Griffiths, & Cox, 1996; Di Martino, 2003; Firth-Cozens, 2003; Karasek & Theorell, 1990; Theorell, 2000; Wider, 1996). The presumed outcome is that health care professionals would show suboptimal performance. This has wide-ranging and far-reaching consequences, most important of which would be the potential life-changing consequences for the patients under their care.

Stress researchers have long recognized that hospitals rate among the highest in stress (Cox, Griffiths, & Cox, 1996). For example, in the UK, the prevalence of stress among nurses is about 3 times the national average (Work Related Stress in the NHS - In Equilibrium, 2007). Similar evidence exists for doctors (Antoniou, Davidson, & Cooper, 2003; Broomfield, Humphris, & Kaney, 1996; Winstanley & Whittington, 2002). Nevertheless, the progression of new knowledge in this regard has been modest.

In this demanding environment, where there is zero tolerance to error, organizations are looking for ways to improve the quality of the social environment that may help to buffer professionals against these stressors and at the same time ensure that patient care remains optimal. Evidence points towards the provision of social support, as well as the possibility for latitude and control in decision-making, as critical factors in determining the quality of the social environment (Bliese & Britt, 2001; Kaufmann & Beehr, 1986; Karasek & Theorell, 1990). In this context, I attempt to answer the following major research question:

To what extent and in what ways can social support and decision latitude/control buffer health care professionals against work stressors in hospital practice?

1.2 Statement of the Problem

Hospital practice offers a complex environment with formal and informal structures of groups/teams, leadership, and decision-making processes.

For the purposes of this research, hospital employees, who are considered at the individual level, are nested within formal structures at the higher or *unit* level, which refers to hospital unit, ward, or consultant-led medical firm.

Informal structures develop as multiprofessional care requires networking depending on both specific patient needs and also on the different stages of particular activities (Payne, 2000). Additionally, this environment constitutes a wide variation in the education, training, experience, and expertise of health care professionals, thereby providing a rich skill-mix and knowledge base. Several stakeholders, namely, patients, clients, relatives and policy makers, continuously scrutinise hospital care for the quality of its delivery. Patients are becoming more assertive and aware of their rights, and indeed, in challenging the traditionally paternalistic doctor-patient relationship, they bring about greater patient empowerment. The socio-psychological impact of health care issues, coupled with high expectations, creates pressures and stressful climates on the various health care providers. On the other hand, the well-being of these professionals is crucial to ensure effective health care delivery along the various scenarios of hospital practice. This is even more so when there is empirical evidence that shows that health care staff, across the health service, are among the most susceptible to stress (Cooper, Sloan, & Williams, 1988; Landsbergis, 1988; Payne & Firth-Cozens, 1987). Another particularly significant factor has to do with the way in which exposure to work-related stress, as well as its related illness, provides the second highest cause of sickness absence in the British NHS, and accounts for 30% of lost time (Work Related Stress in the NHS - In Equilibrium, 2007).

Moreover, all the stakeholders expect health care professionals to perform optimally at all times while remaining professionally up-to-date in the emergence of newer methods and technologies. Although stakeholder awareness is critical, a tangible outcome, as I will demonstrate later in this thesis, is hospital unit performance, which is a reflection of the collective performance of hospital staff within their unit. Thus, it is in the best interest of health care organisations to safeguard the health and well-being of health service staff, who would be better equipped to withstand stress, to cut down on sickness absence, and to perform optimally in the interest of the patients under their care.

1.3 The Two Studies in this Thesis

Within this thesis, I will include two studies designed to address the previously mentioned major research question. This chapter will briefly introduce the two studies and their respective research questions that will provide the basis on which to develop the conceptual framework and testable hypotheses, following a critical review of the relevant literature.

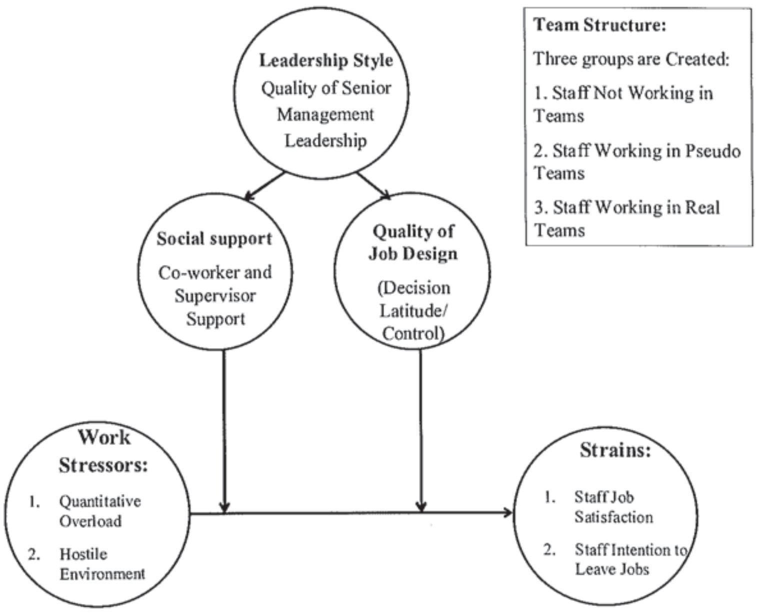
Study one is based on secondary analyses of cross-sectional data, namely the 2003 NHS Staff Survey, gathered in the UK by the Aston Centre for Health Services Organisation Research. I only considered the data involving the acute/specialist trusts in this study. Study two, based on primary data gathered in Malta in 2005/2006, involves the whole population of health care professionals, top management, and supportive administration working at the general hospital on the main island. As indicated by the major research question, the basis of the theoretical framework underlying each study is the buffering hypothesis of the work stressor-to-strain link. Furthermore, both studies utilise acute hospital settings as a research context. However, each study provides unique theoretical perspectives that raise specific research questions, requiring different methodological and analytic strategies. In fact, within the second study, I addressed several issues emerging from the first one.

Study one involves multi-group structural equation modelling at individual level across three levels of team structure. It investigates a model proposing that social support and job design (that includes decision latitude/control), which are predicted by quality of senior management leadership, moderate work stressor-to-strain relationships. The three levels of team structure include those that do not work in teams (no team), those that claim they do work in teams but do not fulfil all the criteria of real teams (pseudoteam), and those that work in well-functioning teams (real team). The sample comprises 65,142 respondents from 172 acute/specialist NHS trusts. The work stressors are quantitative overload and hostile environment, whereas strains include job satisfaction, and intention to leave job – both considered as indicators of psychological strain. The research questions specific to *study one* are:

1. *Are social support and quality of job design influenced by the quality of senior management leadership in hospital practice?*
2. *Are work stressors, namely quantitative overload and hostile environment, associated with strain?*
3. *To what extent do social support and quality of job design moderate the work stressor-to-strain relationships in hospital practice?*
4. *Are there any differences in the study variables and in the relationships proposed in the model between those who work in real teams from those who do not?*

Figure 1.1 shows the conceptual framework of study one.

Figure 1.1: Conceptual Framework of Study One



In contrast to study one, study two is designed as a multilevel study. The term 'multilevel' refers to a hierarchical or nested data structure (Hox, 2002), which in this case, refers to individual hospital employees nested in hospital units. The sample comprises 1,137 hospital staff nested in 136 units in one general hospital. In study two, I recognised that clusters of hospital employees shared the same social environment within their unit, hence the need for the adoption of a multilevel approach.

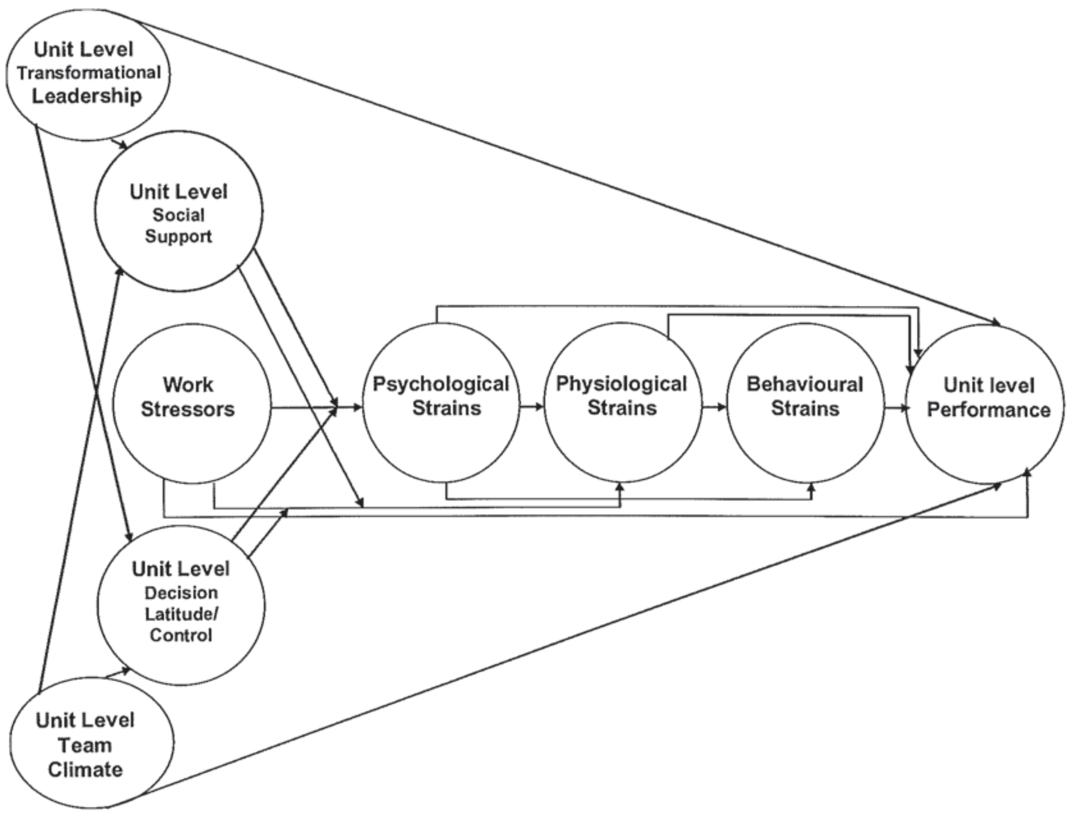
As in study one, study two investigates the 'buffering' hypothesis of social support and decision latitude/control in moderating work stressor-to-strain relationships. This study however looks at transformational leadership and team climate as unit level predictors of unit-level climate for social support and decision latitude/control across hospital units. Furthermore, study two also recognised theoretically and empirically the conceptual link of the buffering hypothesis of the stressor-strain relationship with hospital unit-level performance. Indeed, as health care is becoming increasingly patient-centred and holistic, it is the degree of collective performance by groups of health care professionals which determines the success or otherwise of the entire management plan. This has led to further research questions related to *hospital unit*, as opposed to *individual*, performance. Therefore, performance is a reflection of the quality of health care, with attention to detail, and a focus on medical, as well as social models of care. The research questions specific to *study two* are:

1. *To what extent and in what ways are hospital employees' work stressor-to-strain relationships associated with externally-rated unit-level performance in hospital practice?*
2. *To what extent are unit-levels of transformational leadership and team climate associated with unit-level climate for social support and decision latitude/control across hospital units?*
3. *To what extent and in what ways can unit-level climate for social support and decision latitude/control buffer hospital employees' work stressor-to-strain relationships?*

4. *Are unit-level measures of shared transformational leadership and team climate associated with externally-rated unit-level performance in hospital practice?*

Figure 1.2 shows an illustration of the hypothesised relationships in study two.

Figure 1.2: Illustration of Hypothesised Relationships in Study Two



Study two looks at a wider array of work stressors than *study one*. These include the full picture of the hospital employees' nature of their work, primarily with a focus on the psychological and physical work demands, as well as the quantitative and qualitative workload. Other work stressors include interpersonal conflict, incidents at work, organisational constraints, and organisational change. Additionally, this study considers three perspectives of strains, namely, physiological, psychological, and behavioural perspectives. The construct 'psychological strains' is a composite of job satisfaction, the intention to leave a job, and burnout. Finally, data on absenteeism from the Human Resource Department provide an objective measure of behavioural strain.

1.4 Theoretical Underpinnings to Conceptual Frameworks

The theoretical underpinnings of *the work stressor-to-strain* relationships in hospital settings are two specific but related theoretical concepts, namely the demand control (support) model by Karasek and colleagues (1979, 1990) and the structural model of burnout by Maslach and colleagues (1996). Karasek, Maslach, and their colleagues in the US, as well as Theorell, Schaufeli, and their colleagues in Europe, provided robust theoretical and empirical contributions in the fields of stressor-strain relationships that include burnout, buffering hypotheses, as well as links to various outcome measures.

Furthermore, the proposed research aims to address the extent to which senior management leadership (study one) and transformational leadership and team climate (study two), are associated with social support and decision latitude/control in moderating the work stressor-to-strain relationships. Study one, however, still includes the team concept, which is investigated by means of multi-group analysis across three groups of team structures, which is to say, no team, pseudo, and real team. The major theoretical underpinnings to these links are the social support and social influence theories that conceptually link with transformational leadership and team climate.

The 'buffer' or moderator is a third variable that influences the zero-order correlation between the independent and dependent variables (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004). This research will therefore consider stressors as independent variables, strains as dependent variables and, social support and decision latitude/control as moderators. What is critical in this research is not just testing whether or not social support and decision latitude/control have an impact on the moderation of stressor-to-strain relationships, but establishing the degree of this moderation. Moreover, shared leadership and team climates may incrementally affect the moderating effects of social support and decision latitude/control in the stressor-strain relationships.

Study two also proposes that unit member behavioural strain mediates the relationships between unit member psychological/physiological strains and externally-rated unit-level performance. Similarly, the study proposes that unit member physiological strain mediates the relationship between unit member psychological strain and unit member behavioural strain. The mediator function of a third variable represents the generative mechanism that enables the focal independent variable to influence the dependent variable of interest (Baron & Kenny, 1986). Finally, study two investigates the association between unit-level measures of leadership and team climate with externally-rated unit-level performance.

1.5 Contribution to Knowledge

This thesis presents broad-based eclectic research that aims to add to the existing body of literature in six major yet related areas of theoretical and empirical work, namely *stressor-strain relationship, demand control (support) model, burnout, transformational leadership, teamwork, and performance management* literature.

There is a substantial body of literature that throws light on these subject areas. However, to my knowledge, no published research that cuts across the interdisciplinary boundaries in the manner projected in this thesis is available. The extensive theoretical and empirical work, which explains the relationships in the proposed conceptual frameworks, assisted me in putting together the relevant ‘pieces’ that make up this complex, yet comprehensive, 'jigsaw puzzle' in an attempt to better understand work practices within hospitals. The major conceptual links are the relationships between leadership and team climate with social support and decision latitude/control, which act as the moderating variables in the stressor-to-strain relationships; and finally, the link with unit performance. The conceptual frameworks of the two studies provide a number of moderating and mediating relationships, some of which have not yet been explored in the published literature.

Furthermore, the current research aims to contribute to the body of knowledge in the following specific areas. What makes this research particularly distinctive is the consideration of transformational leadership and team climate as predictors of social support and decision latitude, a consideration which emphasises the importance of both in creating a positive social environment that may buffer health care professionals from work stressors.

Research on transformational leadership has been on the increase over the past years. However, major exponents on the subject refer to the existence of conceptual ambiguities that still require clarification (Rafferty & Griffin, 2004; Yukl, 2002). This study aims to provide further knowledge on the subject, as well as on the relationships of transformational leadership (and its dimensions) with social support and decision latitude/control across hospital units. Research on team climate and teamwork has also been on the increase. Indeed, a substantial body of literature links teamwork with stress and social support. However, to my knowledge, the association with some of the stressor-strain relationships identified in this research has not yet been explored. Furthermore, study two aims to add to the knowledge that relates unit-level transformational leadership and team climate with *unit*-level performance. Although transformational leadership has been strongly linked with performance in a variety of contexts, it is still largely unexplored within health care.

The published literature on the moderation of the stressor-strain link has mostly involved the military as a research context, whereas within the health care context, stress literature focused mainly on single disciplines, in particular nurses and doctors. Researching multiprofessional settings further adds to the existing body of knowledge, in an attempt to approach real-life scenarios prevalent in hospital practice, where different disciplines interact on a day-to-day basis. Moreover, the adoption of a multilevel perspective in study two builds on and expands Karasek's demand control (support) (DC/S) model and Maslach's structural model of burnout within work and organisational psychology. This is because multilevel analysis takes into consideration the clustering of individuals within units, and therefore, provides findings that are more accurate.

The complexity of the hospital environment, as well as unique research opportunities, such as major organisational changes, provides the scenarios for researching a wide array of work stressors. Indeed, rather than just focusing on psychological demands, as has been the case mainly within the DC/S model, study two captures all facets of the nature of the work involved that also include physical demands, quantitative workload and qualitative workload. Furthermore, the proposed move in 2007 of the Maltese hospital under study, to a newly built site, provided me with an extraordinary unique research opportunity of measuring stress in the face of this major organisational change. As regards strains, study two explores mediated relationships that go from psychological to physiological to behavioural strains.

Finally, I believe that the research argument that I would like to make, namely that of creating the right social environment across hospital units to buffer hospital employees against stressors, would be incomplete had I to ignore the performance of these units as an outcome measure. Needless to say, top performance is the goal of every health care organisation, and it is what ultimately matters to the patients receiving care.

Indeed, contribution to knowledge in this regard is two-fold. First and foremost, publications on performance as an outcome measure are mostly focused on the individual-level. This may be due to problems in analysing unit-level outcomes. Thanks to major recent developments in multilevel statistical techniques, study two aims to contribute to the existing knowledge in the field of performance management by taking a more holistic view of performance in the form of hospital *unit* performance, as rated by external raters. Secondly, by capturing data on unit performance from external raters, as well as sickness absence data from the Human Resource Department, I was provided with different sources of data other than those from survey respondents, thereby minimising common method variance.

1.6 Implications to Research and Management

The broad-based eclectic research presented in this thesis aims to provide evidence in favour of the buffering hypothesis in the stressor-strain relationship in secondary health care. The implications are twofold: On the one hand, on a more practical level, this research aims to suggest to health policy makers and hospital management, different ways for restructuring organisations, redrafting policies, redesigning work practices, and introducing training programmes. For example, this research aims to show that leadership and teamwork provide the right ingredients for a well-performing unit, such that it may be wise for organisations to factor in leadership training and team building as part of the continuing clinical professional development programmes in addition to the usual workload. On the other hand, on a more theoretical level, it aims for further research, since new questions emerge in addition to the ones already raised in both studies.

1.7 Overview of the Structure of the Thesis

In this section, I will provide an overview of the structure of this thesis, which consists of five broad sections. The first section includes the first chapter, in which I have introduced the area under study, and indicated the purpose, significance, and direction of the research undertaken. In the first chapter, I have also introduced the intended contribution of this research to the field of knowledge, as well as its intended implications to research and management.

The second section includes chapters two and three, which provide a review of relevant literature, and which form the basis of the theoretical and empirical support to the two studies.

Chapter two reviews the literature on studies that have focused on the stressor-to-strain relationships, and their moderating or 'buffering' hypotheses. More specifically, this chapter will review the studies on these relationships that emerge from the well-researched interactional theory of stress namely, the demand control (support) model (Karasek & Theorell, 1990). It is the intention of this research to contribute further to this body of knowledge.

Additionally, this chapter will discuss the various stressors and strains mentioned in the literature. Furthermore, I will focus on the studies related to the second interactional theory of stress, namely the structural model of burnout as conceptualised by Maslach and colleagues (1996). Finally, the literature review will focus on the relationship with performance as an outcome measure. In contrast to study two, most studies deal with work stressor-to-strain relationships and performance at an individual level of analysis, and therefore they ignore the contextual factors.

Chapter three will deal with studies on leadership and will focus on transformational leadership (Rafferty & Griffin, 2004) and team climate (Anderson & West, 1998), as these relate to the creation of a work-friendly social environment that provides social support (House, 1981) and enables decision latitude/control (Karasek, 1979) within the unit. This chapter includes a critical review of the literature on leadership in teams or units, which is still in its infancy in particular when it has to do with transformational leadership in teams. Furthermore, this chapter aims to throw light on the documented relationships between leadership/team climate and performance, with a focus on group-level performance.

The third section includes chapter four that covers study one. The fourth section includes three chapters that run through the entire research process for study two. In chapter five, I present the theoretical framework and development of hypotheses. Chapter six covers the methodological issues ranging from the planning stage of research to the process of data collection. Chapter seven covers the procedures regarding the psychometric validation of research instruments and multilevel data, as well as a discussion on the analysis strategy adopted.

The fifth and final section includes three further chapters related to study two, namely chapters eight and nine, which explore and discuss the main research findings. In addition, chapter nine summarizes the research process and identifies the strengths and limitations of the study. Finally, the concluding chapter ten includes the implications primarily for theory, but also for management, and practice. The last chapter also discusses the various avenues for further research.

1.8 Chapter Summary

This thesis includes two complimentary yet distinct studies both of which focus on the moderating effects of job characteristics (social support and decision latitude/control), on the stressor-to-strain relationships, in acute hospital settings. Apart from this similarity, the two studies have distinct comprehensive conceptual and analytic frameworks, as will be shown in the following chapters.

Despite the fact that studies one and two were conducted in different, yet culturally very similar countries, namely the UK and Malta, the focus of this thesis is neither intended as a comparative study, nor as a focus on cultural differences.

In the next two chapters, I will critically review the literature in order to provide the theoretical background to the proposed conceptual frameworks in the two studies.

CHAPTER TWO

THE MODERATING AND MEDIATING RELATIONSHIPS IN THE STRESSOR-TO-STRAIN LINK: A CRITICAL REVIEW OF THE LITERATURE

2.1 Introduction

Chapters two and three are the literature review chapters that critically examine the broad-based eclectic research linking six major areas of theoretical and empirical work, namely: *stressor-strain relationship,* which is based on Karasek's *demand control (support) model* (1979, 1990) and Maslach's *structural* (1996), *as well as three-dimensional models of burnout* (1998), *transformational leadership, teamwork, and performance management* literature.

In chapter three, I will critically review the literature on transformational leadership and teamwork, as it relates to social support and decision latitude/control, stressor-strain relationships, and performance management.

Chapter two will primarily focus on the *stressor-to-strain relationships* and the *moderators* of these relationships, namely, social support and decision latitude/control, in an attempt to answer the following research question:

To what extent and in what way can social support and decision latitude/control buffer health care professionals against work stressors in hospital practice?

The focus then turns to the proposed *mediated* relationships within this link, and it will strive to explore, through the relevant literature, evidence-based relationships between moderated stressor-strain links and performance.

The following research question will be addressed:

To what extent, and in what ways are work stressor-to-strain relationships associated with externally-rated unit-level performance in hospital practice?

2.2 Literature Search Strategy

During the years 2002 to 2007, I carried out an ongoing literature search in which I drew on a variety of sources and used primarily the following electronic databases: Blackwell Synergy, Cochrane Library, EBSCO – Business Source Premier, Emerald, Index to Theses, IngentaConnect, JSTOR, Oxford University Press Journals, Proquest, PsycArticles, PubMed, Science Direct, Swetswise, and Wiley InterScience.

The key words used were a combination of burnout, control, co-worker support, decision latitude, decision-making, doctors, effectiveness, errors, health, health care professionals, hospitals, incidents, intention to leave, interdisciplinary, interprofessional, interpersonal conflict, job satisfaction, leadership, moderation, mediation, multidisciplinary, nurses, multilevel, organizational change, organizational constraints, performance, physical exertion, physiological, psychological, qualitative, quantitative, senior management leadership, social support, supervisor support, stress, strain, stressor-strain, team, teamwork, team climate, transformational leadership, transactional leadership, work demands, and workload.

Furthermore, I made use of several key texts and doctoral dissertations on the subject areas in this research, which I will refer to in-text, as well as in the reference section.

2.3 The Stressor-Strain Relationship

Clear understanding of the theoretical concepts is crucial in determining the nature and direction of one's research. This section looks at the evolution of major models of work stress, and considers the definitions of stress employed by different paradigms, with their limitations and contributions.

The conceptualisation and operationalisation of work stress has been characterised by wide discrepancies (Jex, Beehr, & Roberts, 1992). The Latin derivation of the word stress is *'stringere'* meaning to draw tightly. Robbins (1998, p.653) defined stress as a:

> *"...dynamic condition in which an individual is confronted with an opportunity, constraint, or demand related to what he or she desires and for which the outcome is perceived to be both uncertain and important."*

This definition relates stress to the pressures which all individuals encounter in their professional or private lives. The context then determines whether these pressures are positive – an opportunity or negative – a threat or demand, or both. Most of the literature on job stress has highlighted the negative outcome by means of psychological and physiological disorders, illness, and disability, resulting from exposure to stressful working conditions (Karasek & Theorell, 1990). There are three perspectives of the definition of *work stress* (Jex, Beehr, & Roberts, 1992): as a stimulus, a response, or a stimulus-response relationship, with methodological and analytical implications. For the sake of theoretical clarity, I will examine these three perspectives separately:

1. <u>Stress as an independent variable</u> – *stimulus*:

This refers to job *stressors* that include the physical or psychological stimuli to which individuals respond (Cooper & Quick, 1999). Stimulus-based definitions of stress focus on the identification of sources of stress, internal or external to the job that may potentially disrupt the individual's equilibrium of well-being. Ivancevich, Matteson, Freedman, and Phillips, (1990) differentiated worksite stressors into individual, organizational and individual/organizational interface. Similarly, Cartwright and Cooper (1997) identified six work-related stressors namely: factors intrinsic to the job, roles in the organization, relationships at work, career development issues, organizational factors and the home-work interface. This research will consider the first five of these categories that relate to stressors within the workplace.

A wide variety of stressors has been described across contexts namely quantitative and qualitative workload distinguishing the amount of work from the depth of thought and skills required to perform tasks (Spector & Jex, 1998). Furthermore, researchers have discerned work demands, which are physical in nature, from psychological ones referring to the corporal as opposed to the emotional stressors exposed to, at work (Karasek, 1979, Karasek & Theorell, 1990; Karasek et al., 1998).

Rees (1995) reported that stress is a major problem across all occupational groups within the National Health Service in the UK. Major recognised causes of stress perceived by nurses, junior doctors and consultants are: erosion of autonomy, lack of control over work, poor work-life balance, rigidity of the hierarchy, doing tasks below grade, lack of the right tools, broken tools to do the job, increase in patients' expectations, increase in administrative duties, organisational confusion, isolation from other team members, colleagues not understanding each others' roles and competencies, lack of management support, and the fear of making mistakes (Allen, 2001).

Similarly, Gray-Toft and Anderson (1981) identified seven major sources of stress in nurses, namely, the stress arising from death and dying, conflict with physicians, inadequate preparation to deal with the emotional needs of patients and their families, lack of staff support, conflict with other nurses and supervisors, workload, and finally, uncertainty concerning treatment. This list of stressors reflects the differentiation between the physical from psychological demands, as well as that between the qualitative and the quantitative aspect of one's workload.

Against this background of recognised work stressors in health care, I have selected several well-known psychometrically validated tools that comprehensively capture the most commonly perceived work stressors. Despite the availability of several tools, I will focus on the ones used in this thesis.

The Job Content Questionnaire (Karasek et al., 1998), used in study two, measures quantitative as opposed to qualitative work demands, and distinguishes physical from psychological demands. Spector and Jex (1998) developed three self-report Occupational Stressors Scales, which are Interpersonal Conflict at Work Scale (ICWS), Organizational Constraints Scale (OCS), and Quantitative Workload Inventory (QWI). Furthermore, Gray-Toft and Anderson (1981) developed the Nursing Stress Scale that consists of items that describe situations that cause stress for nurses in the performance of their duties. I developed the qualitative workload scale based on the adaptation of some items from this scale.

2. <u>Stress as a dependent variable</u> – *response* refers to *strain*:

This refers to the psychological, physiological, and/or behavioural deviation from an individual's healthy functioning in response to stressors (Cooper, Dewe, & O'Driscoll, 2001; Cooper & Quick, 1999). The literature refers to strain as considered from three perspectives (Quick, 1998; Cooper & Quick, 1999).

First, strain includes the psychological perspective, namely, job satisfaction, intention to leave job, emotional exhaustion, depersonalisation, and reduced personal accomplishment (the last three being the three dimensions of burnout) (Akerboom & Maes, 2006; Karasek & Theorell, 1990; Maslach & Jackson, 1982; Van der Doef & Maes, 1999). It also includes the physiological perspective, which is to say, physical and mental well-being. For example, exposure to stress poses a higher risk towards cardiovascular disease back pain, tension headaches, irritable bowel syndrome, distress, anxiety, and depression (Kristensen, 1995; Theorell & Karasek, 1996).

Furthermore, strain manifests itself in a behavioural manner such as absenteeism (Bekker, Croon, & Bressers, 2005; Mason & Griffin, 2003), turnover (Gray-Toft & Anderson, 1981), as well as increased susceptibility to errors and accidents (NHS staff survey, 2004).

There is substantial evidence of reported psychological, physiological, and behavioural strain in health care and particularly in hospitals (Cox, Griffiths, & Cox, 1996; Firth-Cozens, 2003; Landsbergis, 1988; Lert, Chastang, & Castano, 2001; Seago & Faucett, 1997).

Several psychometrically validated tools measure strain. For example, Maslach's Burnout Inventory (Maslach & Jackson, 1981; 1982) is the most popular tool for burnout, which is widely considered by researchers as an indicator of psychological strain.

Karasek's JCQ (1998) measures physical and psychosomatic strain. Spector and Jex (1998) provided one job strain scale - the Physical Symptoms Inventory (PSI), which probes for potential symptoms of strain such as headaches, heartburn, and insomnia experienced in the preceding thirty days.

3. Stress as a *stimulus-response* relationship:

This takes into consideration the person-environment relationship, which is either a structural and quantitative *interaction* or a dynamic cognitive state - *transaction* (Lazarus & Folkman, 1984). This distinction categorizes work stress theories into *interactional* and *transactional* theories (Dollard, 2002) which, overlap and complement each other despite a different shift in emphasis.

The stimulus- and response- based definitions of stress offer a one-dimensional perspective of a simple stimulus-response paradigm and have been criticised for reflecting one component rather than a comprehensive theory of the whole stress process (Cooper et al., 2001). Because of this, differences in individual attributes, role and status, as well as contextual factors in terms of social support and control tend to be overlooked.

Using the single word stress may therefore create confusion on interpretation (Jex, Beehr, & Roberts, 1992) and hence, to avoid potential confounding, the specific use of *stressor-strain* as a stimulus-response link has become increasingly popular in the literature. Indeed, *stress* in the stressor-strain link refers to the mediating state that the stressor stimulates, a state eventually resulting in strain. Rather than focusing on this intermediate state, empirical research has investigated the stressor-strain link (Dollard, 2002; Karasek, 1989; Karasek & Theorell, 1990).

Of relevance to the current research is the evidence of mediated relationships in the stressor-strain link. For example, Schaufeli and Bakker (2004) found, by means of structural equation modelling, that burnout mediated the relationship between job demands and health problems.

de Jonge et al. (1996) had earlier demonstrated, also by means of structural equation modelling that emotional exhaustion mediated the relationship between job demands and health complaints. Similarly, Bekker, Croon, and Bressers (2005) found that emotional exhaustion mediated the relationship between workload and sickness absence.

The interactional theories include the demand-control/support and the burnout models, whereas the transactional theories include the effort-reward model and the cognitive – phenomenological theory of stress. I will focus on the interactional theories, which explain the moderator hypotheses in the stressor-strain relationships, and will therefore form the conceptual basis of this research.

2.3.1 Interactional theories

Interactional theories focus on the structural features of a person's interaction with their work environment. I will now describe the demand control (support) and the burnout models.

2.3.1.1 Historical Perspective of the Demand Control (Support) (DC/S) Model of Work Stress

In 1979, Karasek developed the demand-control model, also referred to as the demand-decision-latitude model, which proposes that psychological demands and decision latitude interact to produce psychological strain. The aim behind the DC/S model was to enhance the quality of working life. According to de Jonge et al. (1996), the DC/S model developed from two lines of research. Firstly, the Michigan tradition (Pelfrene, 2001), focused on the health effects of workload and conflicting job demands. Secondly, the Job Design tradition, as part of the Job Characteristics Model (JCM) (Hackman and Oldham, 1980) stressed on the importance of job control and skill level for job satisfaction and mental health.

Decision latitude refers to the individual faculty of facing to work demands and pressures, including autonomy, responsibility, skilfulness, training, and experience (Di Martino, 2003). Karasek (1979) contended that demanding jobs with a low range of decision-making freedom/control are detrimental to employee's well-being and result in strain, irrespective of individual differences in appraisal or coping.

Job demands are the physical, psychological, social, and organisational aspects of the job that require unremitting physical and psychological energy. Indeed, high demands lead to both physiological and psychological consequences because of their energy-draining effort (Schaufeli & Bakker, 2004).

The role of decision latitude in the DC model clarified earlier studies that could not explain a higher degree of job satisfaction in executives as compared to assembly-line workers, despite their higher qualitative job demands (Karasek, 1979).

Indeed, employees with high status have frequent opportunities to control high levels of demands which stimulate them in increasing their activity level (Dollard, 2002). Tetrick and LaRocco (1987), as well as Glass, McKnight, and Valdimarsdottir (1993) identified control over work-related decision making as an important impact on job stress and job satisfaction. Figure 2.1 illustrates the demand-control model.

Figure 2.1: The Psychological Demand-Decision Latitude Model by Karasek (1979; 1990)

The neglect of control over decision-making, and socialization in the earlier models of occupational stress maintained the focus of stress reduction interventions on the individual (Landsbergis, 1988). These earlier models were based on the Person-Environment Fit (P-E) theory (Caplan & Van Harrison, 1993), which claims that stress results from demands that a person may not be able to meet, or insufficient supplies to meet the person's needs, but does not include control over decision-making. While there is no doubt about the validity of the P-E Fit theory, Karasek's job demands-control model unequivocally incorporates control (decision latitude) and socialization (activity level), which is to say that different combinations of the two variables demands and control, result in different activity levels. This shifts the focus of stress reduction interventions from the individual to the organization.

Indeed, Karasek (1979; 1989) argued that work stress arises primarily from the structural or organisational aspects of the work environment such as workload, pace of work, length of working hours, time schedules and time deadlines (Di Martino, 2003) rather than from personal attributes or demographics. However, Karasek (1989) claimed that the model does not prohibit the inclusion of personal factors.

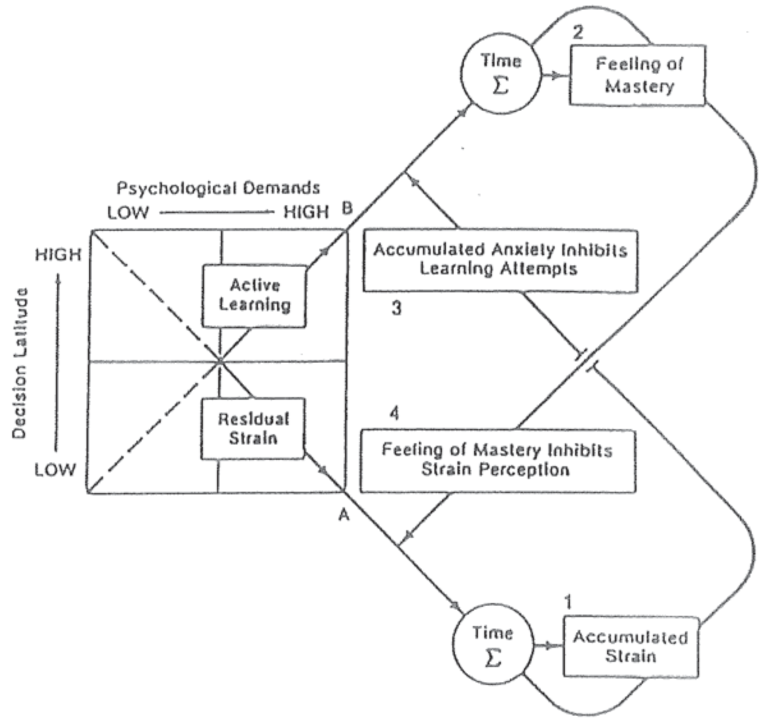
Applying the model to the health sector, Karasek and Theorell (1990) identified physicians and nurses as located in the active job quadrant, and health technicians and nurse's aides in the high strain quadrant which is the one at higher risk.

The original model developed into a 'dynamic version of the demand-control model' as shown in Figure 2.2 (Karasek & Theorell, 1990; Theorell & Karasek, 1996) (overleaf). This shows the relationship between the original demand-control model emphasizing the psychosocial environment and the temporal influence on the individual traits that determine the psycho-physiological and behavioural outcomes.

Figure 2.2: The Dynamic Version of the Psychological Demand-Decision Latitude Model (Karasek & Theorell, 1990; Theorell & Karasek, 1996)

Diagonal A: Daily residual strain arising from a stressful job situation gives rise, over a period, to accumulated feelings of exhaustion, which may inhibit learning attempts when faced with learning challenges.

Diagonal B: With time, the active job situation is associated with the development of a feeling of mastery that in turn inhibits the perception of job strains during periods of overload. These result in an increase in job satisfaction, motivation, learning, efficacy, mastery, challenge, and performance.



In 1988, Johnson and Hall redefined the DC model by introducing the concept of work-related social support as a moderator of the stressor-strain link. This gave rise to the **demand control (support) DC/S model** – (Johnson, 1989; Johnson and Hall, 1988), suggesting that supporting interpersonal relationships at work may function as 'buffers' in stressful jobs. Morgan (1990) defined social support as the feeling of being supported by others and is characterised by an exchange of help within relationships when coping with stress.

Di Martino (2003) referred to social support as a characteristic of the social environment that includes organizational culture, working climate, management style, and help from co-workers, as well as involvement, participation, and team working. Karasek (1990) noted that all the categories of health workers achieved favourable positions in the model in the presence of social support. In the expanded model therefore, jobs with high demands, low control, and low support from supervisors or fellow employees carry the highest risk.

The DC/S model is a three-way interaction within which social support further confines the two-way interaction hypothesised by the demand-control model (Bliese & Castro, 2000). The DC/S model is the theoretical underpinning for the Job Content Questionnaire (JCQ) (Karasek et al., 1998), which is a widely used, psychometrically tested, instrument. JCQ measures the "content" of a respondent's work task(s) and is applicable in a variety of contexts, in different cultures.

The DC/S Model has been criticised for being simplistic and predictable (Dollard, 2002). Additionally, tests of the model are mainly based on self-reports potentially resulting into subjective rather than objective assessments (Muntaner & O'Campo, 1993). However, Spector (1987) has provided evidence that self-report is consistent with objective ratings of the work environment. The DC/S model attracts considerable empirical support, evidenced by its dominance in occupational stress research (Theorell, 1998). This is partly due to the availability of established tools that enable empirical testing.

In the field of Public Health, several epidemiological studies have provided convincing evidence in favour of the DC/S model (de Jonge & Kompier, 1997; Theorell &

Karasek, 1996). Berkman and Syme (1979) demonstrated the association between social support and longevity for the first time in a classic epidemiological study. Furthermore, Cohen and Wills (1985) provided a review and a theoretical analysis of the research on social support and health, claiming that large social networks, which give rise to regular positive experiences, have a direct positive effect on well-being.

In a review of 81 studies, Uchino, Cacioppo, & Keicolt-Glaser (1996), found that social support is associated with positive health aspects particularly related to cardiovascular, endocrine and immune systems. Similarly, Theorell et al. (1998) have shown in ten year longitudinal studies that psychological job strain predicts myocardial infarction in working men.

Several reviews provided solid evidence in favour of the DC and DC/S models. In a review of twenty years of empirical research involving 63 studies, Van der Doef and Maes (1999) distinguished between the job demand-control (DC) and the job demand-control-support (DC/S) models. According to the strain hypothesis of the DC model, employees in high-strain jobs experienced the lowest well-being.

The iso-strain hypothesis of the DC/S model predicted the worst outcomes for workers in an iso-strain job (high demands-low control-low support). Van der Doef and Maes (1999), however, remarked that the buffer hypothesis of DC/S model (namely, that social support moderated the negative impact of high strain on well-being), was less consistent. Indeed none of the longitudinal studies in this review supported the buffer hypothesis. A key factor that determined whether studies supported the models was the conceptualisation of demands and control, namely those only aspects of job control that corresponded to the specific demands of a given job moderated the impact of high demands on well-being. On a similar note, vulnerability to high iso-strain situations and benefit from high control appeared to be gender- and personality-specific.

In a review of 45 longitudinal studies, de Lange et al. (2003) addressed the methodological quality of longitudinal research that utilised Karasek and Theorell's (1990) demand-control-(support) models. The five criteria for evaluating methodological quality were type of design, length of time lags, quality of measures, method of analysis, and non-response analysis. Out of the 45 longitudinal studies, the 19 (42%) studies that obtained acceptable scores on all criteria provided only modest support for the hypothesis that a combination of high demands and low control results in high job strain. These studies however provided good evidence for lagged causal effects of work characteristics, especially for self-reported health or well-being outcomes. In addition to these reviews, Table 2.1 shows nine organisational studies, in various contexts and methodologies, which in their majority provided empirical evidence in favour of the DC and the DC/S models.

Table 2.1
Empirical Evidence in Favour of the Demand-Control-Support Model

Authors (Year)	Study	Sample/ Methodology	Findings	Comments
Amick, Kawachi, Coakley, Lerner, Levine and Colditz (1998)	Relationship of job strain and iso-strain to health status in a cohort of women in the United States.	N=33698, Working women (nurses)/ Cross-sectional survey	High strain (high job demands and low job control) workers showed lower vitality and mental health, higher pain, and increased risk of both physical and emotional limitations than workers in active jobs. Iso-strain (High strain-isolated i.e. low work-related social support) work increased the risks further. The analyses supported the hypothesis that the psychosocial work environment is an important determinant of health status among working women.	**DC/S model supported.** The findings suggest that incorporating social conditions at work into the measurement of psychosocial work-environment improves the identification of high-risk work arrangements.

Table 2.1...Continued
Empirical Evidence in Favour of the Demand-Control-Support Model

Authors (Year)	Study	Sample/ Methodology	Findings	Comments
Bliese and Castro (2000)	Role clarity, work overload, and organizational support: Multilevel evidence of the importance of support.	N=1786, Lower enlisted male soldiers/Cross-sectional survey	Significant three-way cross-level interaction between organizational support, role clarity and work overload	**DC/S model supported.** Role clarity used instead of control. Importance of multilevel analysis in organizational studies emphasised.
Bosma et al. (1997)	Low job control and risk of coronary heart disease in the Whitehall II (prospective cohort) study.	N=6,895, Civil servants from 20 London-based civil service departments/ Longitudinal study: two waves, length of follow-up – 5 years.	Low job control had a higher risk of coronary heart disease. Job control assessed on two occasions three years apart had cumulative effects on newly reported disease. Subjects with low job control on both occasions had an odds ratio for any subsequent coronary event of 1.93 (95% confidence interval 1.34 to 2.77) compared with subjects with high job control at both occasions. This association not explained by employment grade, negative affectivity, or classic coronary risk factors.	**DC or DC/S model not supported.** Effects of job demands and social support on coronary heart disease not significant at $p<.05$. Evidence of causation: Normal causation present; Reverse causation not explored.
Bourbonnais and Mondor (2001)	Job strain and sickness absence among nurses in the province of Québec.	N=1,793, Nurses/ Longitudinal study: two waves, length of follow-up – 1 year 10 months.	Short-term absenteeism associated with job strain (incidence density ratio (IDR) = 1.20) and with low social support at work (IDR = 1.26). Certified sick leave significantly associated with low social support at work (IDR = 1.27 for all diagnoses and IDR = 1.78 for mental health diagnoses).	**DC and DC/S models supported.** Objective measurement of absenteeism. Evidence of causation: Normal causation present; Reverse causation not explored.
Dollard (1996)	Work stress: Conceptualisations and implications for research methodology and work place intervention.	N=419, Correctional officers. N=109, Nurses/ Longitudinal study: two waves, length of follow-up – 1 year.	Occupation predicted levels of strain and well-being in individual cases as per DC/S model. DC/S model predicted strain and well-being in correctional officers and in nurses. Strong support for DC/S model found in correctional officers. Modest support for DC/S model found in nurses.	**DC/S models supported.** Evidence of causation: Normal causation present; Reverse causation not explored.

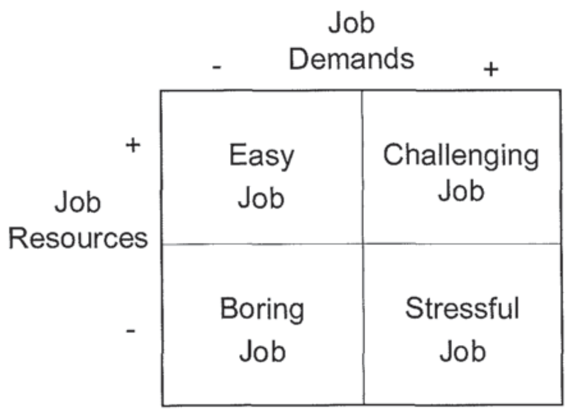
Table 2.1...Continued
Empirical Evidence in Favour of the Demand-Control-Support Model

Authors (Year)	Study	Sample/ Methodology	Findings	Comments
Parkes, K. R., Mendham, C. A. and Von Rabenau, C. (1994)	Social support and the demand-discretion model of job stress: Test of additive and interactive effects in two samples.	Study I: N=145, Psychiatric health care workers in the UK. Study II: N=180, Graduate students/ Longitudinal Studies: two waves, length of follow-up – 2 months.	Job satisfaction positively related with the main effect of support, and with the demand discretion interaction. In both Study I and Study II, somatic symptoms predicted by a three-way demand-discretion- support interaction. Social support acted in a buffering role: high strain was associated with high somatic scores only when support was low, while low strain was associated with low symptom levels irrespective of support level.	**DC/S models supported.** Social support was an independent predictor and promoted satisfaction and well-being. Evidence of causation: Normal causation present; Reverse causation not explored.
Schaubroeck, J., and Fink, L. S. (1998)	Facilitating and inhibiting effects of job control and social support on stress outcomes and role behaviour: A contingency model.	N=428, Insurance employees and their supervisors/ Cross-sectional survey	Significant DC/S interactions were observed more consistently for supervisory support than for support from co-workers. Plots of the interaction did not support the buffering hypothesis that support buffers the effects of high strain i.e. low control, high demand jobs.	**Mixed evidence for the DC/S model** as when low levels of control cannot be avoided, increased social support may not have the predicted stress-buffering effect
ter Doest and de Jonge, (2006)	Testing causal models of job characteristics and employee well-being: A replication study using cross-lagged structural equation modelling	N=133, Health care employees/ Longitudinal Study: two waves, length of follow-up – 2 years.	Effects of job stressors on employee well-being were discernable over a two-year interval in a full-panel SEM analysis including control variables. Regular causation i.e. job characteristics influence well-being offered the best account.	**DC/S models supported.** Evidence of causation: Normal causation present; Reverse causation explored.
Van Der Doef, M., Maes, S., and Diekstra, R. (2000)	An examination of the Job Demand-Control-Support Model with various occupational strain indicators.	N=4000, Complete diversity of professions /Cross-sectional Study	High time pressure, low control, and low social support are associated with lower well-being. Absenteeism is only associated with low control and low social support.	**DC/S models supported.** The focus should not be exclusively on control but social support is an important part of the model for the creation of 'healthier work'.

Schaufeli and Bakker (2004) argued that although not intentionally negative *prima facie*, work demands might become stressors, if both the effort required or the resources available to complete the job do not match its demands. Indeed complimentary to the definition of job demands, the authors defined job resources as the physical, psychological, social, and organisational aspects of the job that might reduce job demands and at the same time are functional in achieving goals, and stimulate personal growth, learning, and development.

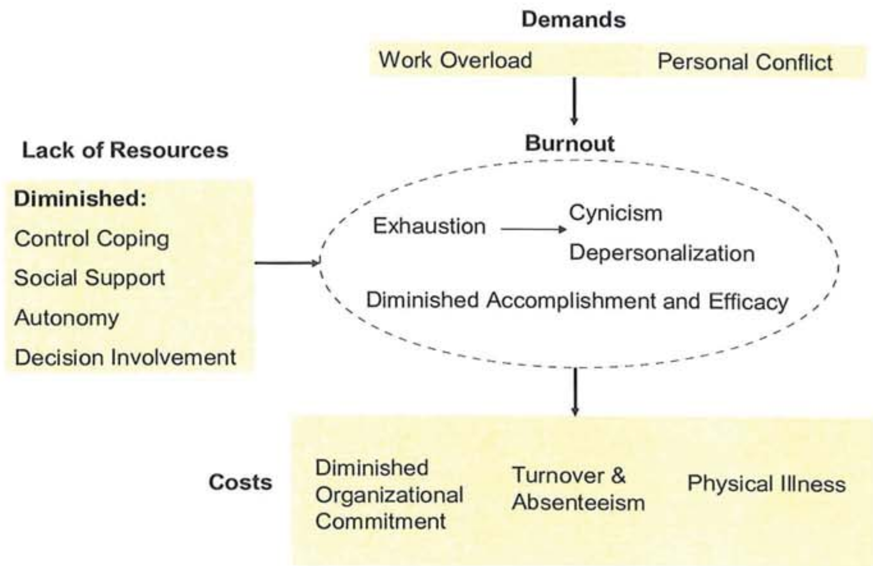
In study two, specific to job resources, I tested for organisational constraints (the physical and organisational aspects of job resources), co-worker support (the interpersonal level), and supervisor support (organisational level). High demands and low resources are frequent stressors mentioned in the stress literature in health care. In line with the Job Demand-Resources Model (JD-R), successfully tested by Demerouti, Bakker, Nachreiner, and Schaufeli (2001), high job demands and low job resources result in a stressful job (Figure 2.3).

Figure 2.3: The Job Demands-Resources Matrix (Adapted from Schaufeli, 2004)
(W.B. Schaufeli, Personal Communication, May 9, 2007)



Earlier on, Maslach, Jackson, and Leiter (1996) developed a structural model of burnout (Figure 2.4). This model postulates that job demands (by means of work overload and personal conflict) in the absence of specific resources (control coping, social support, autonomy, and decision involvement) predict burnout, which then results into negative outcomes in the form of costs.

Figure 2.4: The Structural Model of Burnout **(Maslach, Jackson, & Leiter, 1996, p. 36)**



The structural model of burnout explains the conceptual link of the DC, DC/S, and JD/R models with burnout, as well as with behavioural strains (turnover and absenteeism) and performance (diminished organizational commitment). However, in the next section, I will focus on the second interactional theory of stress namely, the multidimensional model of burnout (the green ellipse in Figure 2.4), which features prominently in study two presented in this thesis.

2.3.1.2. A Historical Perspective of the Multidimensional Model of Burnout

This section offers a definition of burnout and a brief chronological overview intended to set the stage for the development of the *strain* part in stressor-strain relationship in the conceptual model of study two. Burnout is a critical subject in various contexts as research shows that it inhibits human potential and leads to poor performance, loss of work time and low levels of productivity (Wright & Bonett, 1997). Research on burnout features in the fields of social psychology, social work, anthropology, medicine, education, and communication aiming to find interactions, models, and applications in the "helping" professions.

Despite the fact, that burnout as a concept emerged more than three decades ago, it still features as a prominently debated phenomenon in the literature (Cox, Tisserand, & Taris, 2005). Bradley (1969) first described burnout in probation officers as a psychological condition that develops because of prolonged and unrelieved work stress. In the human service professions that included health care, Freudenberger (1974) was the first to define burnout as exhaustion resulting from intense demands coupled with unsatisfactory incentives. Later, Maslach (1976) and Cherniss (1980) defined burnout as psychological distancing from work.

Several medical viewpoints describe burnout as a syndrome characterised by symptoms such as fatigue, depression, anxiety, headaches, disturbed sleep, and susceptibility to illness (Firth-Cozens, 2003; Johnstone, 1999; Medline Plus: Medical Dictionary, 2004; Wider, 1996). Physiologically, research has shown that a major indicator of burnout is reduced hypothalamic-pituitary-adrenal (HPA) axis function and consequent low plasma cortisol (Pruessner, Hellhammer, & Kirschbaum, 1999). The symptoms and physiological profile of burnout are quite similar to those described in chronic fatigue syndrome (Reid, Chalder, Cleare, Hotopf, & Wessely, 2000) such that it is likely that they are in fact the same state. Cherniss (1980) and Golembiewski, Boudreau, Sun, and Luo (1998) suggested that burnout distribution follows a pattern of contagiousness, suggesting that burnout can spread to individuals in an organization not previously affected.

Maslach (1982) warned against the indiscriminate use of the term burnout. Indeed, Maslach and Jackson (1981) introduced the emotional aspect and described burnout as resulting in weakening of emotional resources, characterised by emotional fatigue and cynicism. Through research, this eventually led to a multidimensional definition in terms of Maslach's three-component conceptualization of burnout (Maslach & Jackson, 1981, 1982). The dimensionality issue has provoked much debate that has to do with the extent to which burnout comprises one, two, or three dimensions (Cox, Tisserand, & Taris, 2005) and with the chronological sequence of development in the two- or three-dimensional models, as will be discussed in this section.

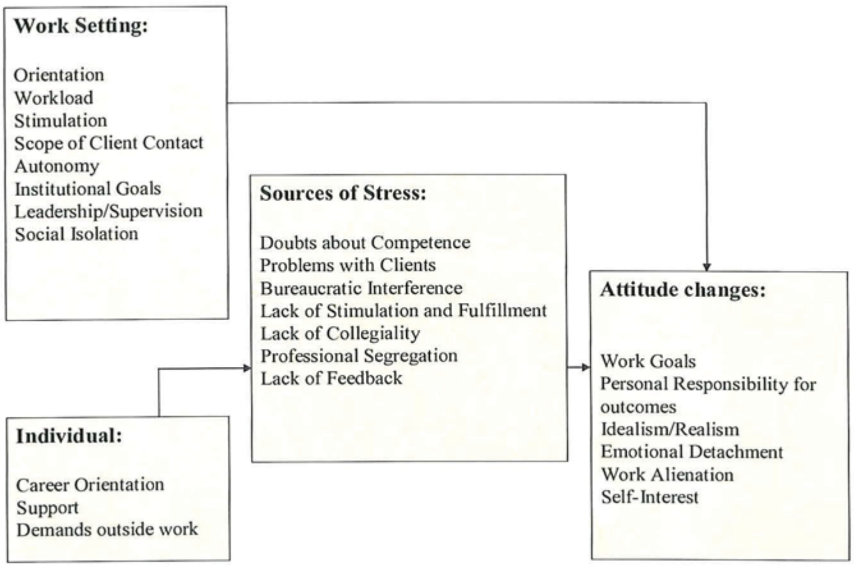
The three components of the multidimensional definition of burnout are:

1. *Emotional exhaustion* – depleted emotional resources and a lack of energy. It represents the basic *individual* stress dimension of burnout.
2. *Depersonalization* – unconstructive, pessimistic, and sarcastic attitudes towards clients, who are irrationally deemed as somehow deserving of their ailments in life. This component represents the *interpersonal* dimension of burnout
3. *Reduced personal accomplishment* – negative self-evaluation and dissatisfaction about work-related accomplishments and progress on the job. This represents the *self-evaluation* dimension of burnout.

The variety of ways of conceptualising burnout provides a wide variety of perspectives on the subject in the literature. Some researchers adopted a one-dimensional approach of burnout by defining it in terms of only emotional exhaustion (Bekker, Croon, & Bressers, 2005; Kristensen, Borritz, Villadsen, & Christensen, 2005). Other researchers questioned whether it is necessary to use all the three dimensions to conceptualise burnout as a syndrome, and opted for two-dimensional approach by dropping personal accomplishment, while retaining emotional exhaustion and depersonalisation (Cox, Tisserand, & Taris, 2005). Others such as Taris, Le Blanc, Schaufeli, and Schreurs (2005) remained faithful to the three-dimensional concept. However, there appears to be consensus that emotional exhaustion remains the critical component in burnout, both from a theoretical, as well as from an empirical aspect. There are four major burnout developmental theories that are built upon the Maslach's multidimensional definition. These models vary in their proposition of the critical role of each component and the sequence of events in burnout development (Cooper, Dewe, & O'Driscoll, 2001). The four models are:

1. *Cherniss's process model of burnout* (Cherniss, 1980) (Figure 2.5).

Figure 2.5: Adapted Cherniss's Process Model of Burnout
(Cooper, Dewe & O'Driscoll, 2001, p. 86)

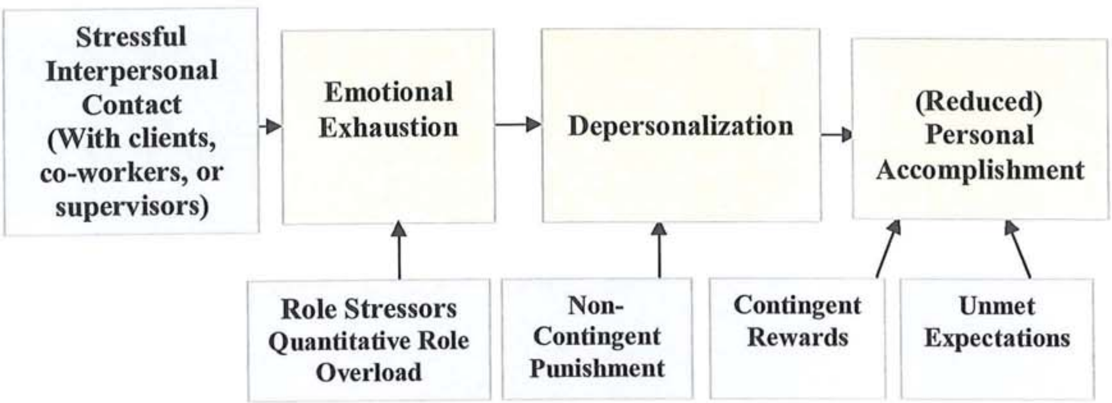


In this model, work setting characteristics and individual difference variables have both direct effects on burnout and indirect effects on attitude changes including burnout through levels of experienced stress. Cherniss (1980), when interviewing freshly recruited public human services professionals, found that communication behaviours in the workplace namely organizational conflict, distrust, inflexibility, and deep-rooted uncommunicative behaviours lead to a "sense of helplessness in the face of failure that is the major contributor to burnout" (p. 78). Cherniss's research showed that professional segregation, lack of collegiality, and feedback were standard practice. Additionally, supervisor-employee relations were not supportive, thereby rendering the social work environment uncommunicative for both the experienced and new service providers. In this study, it became clear that those already in place conveyed a negative influence on newcomers such that burnout extended to the entire group. Cherniss's model gained empirical support but was criticised for including a broad range of variables rendering burnout indistinguishable from job strain (Burke & Greenglass, 1995; Cooper, Dewe, & O'Driscoll, 2001).

2. *Leiter and Maslach's sequential model* of burnout development based on Maslach's three-dimensional concept of burnout (Leiter & Maslach, 1988).

In contrast to Cherniss's model, Leiter and Maslach's model focuses and defines the uniqueness of burnout as a three-dimensional sequence of events (Cordes, Dougherty, & Blum, 1997). This model defines emotional exhaustion, as the critical component in the burnout process, which develops first, as illustrated in Figure 2.6 (overleaf).

Figure 2.6: Leiter and Maslach's Sequential Model of Burnout Development
(Cooper, Dewe, & O'Driscoll, 2001, p. 91; Cordes, Dougherty, & Blum, 1997, p.690)

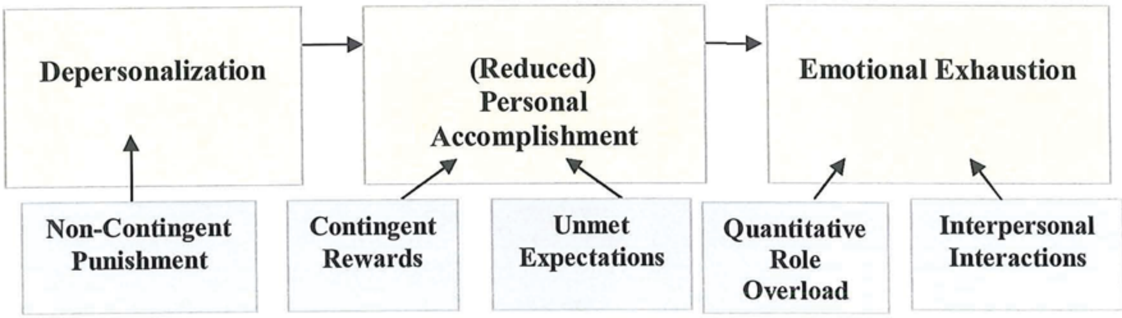


The model in Figure 2.6 projects burnout as being characterised by active processes that focus on group dynamics and social support, and is analytically a within-subjects path model (Cordes, Dougherty, & Blum, 1997). This model also shows that workload and personal conflict aggravate exhaustion; non-contingent punishment aggravates depersonalisation, whereas support, by means of contingent rewards and satisfying unmet needs, influences personal accomplishment.

3. *Golembiewski's sequential and phase models of burnout development*

Golembiewski and Munzenrider, (1988) asserted that the right level of professional detachment, as supported by professional ethics and norms, is functional, for example, when dealing with patients. However, when work demands go beyond a certain level, depersonalization manifests itself as the first component of burnout. The consequence is impaired judgement, reduced personal accomplishment, and eventually emotional exhaustion because of diminished individual's coping ability. Golembiewski and Munzenrider adopted the Maslach three-component model of burnout but argued that the second component in that model, depersonalization, is the aspect that is first experienced in the sequence as shown in Figure 2.7 (overleaf). Despite its later development in the model, emotional exhaustion remains the critical component as in Maslach's model. Consistent with the sequence in Figure 2.7, Golembiewski and colleagues devised an eight-phase between-subjects model by dividing each subscale into high and low groups as illustrated in Table 2.2. The authors claimed that the model does not imply that the phases proceed sequentially. Similarly, Leiter (1993) questioned the burnout continuum implied in the phase model and notes that the phases are designed to focus on the criticality of emotional exhaustion, which changes from low (phase I to IV) to high (phase V to VIII), thereby diminishing the role of depersonalization and personal accomplishment.

Figure 2.7: Golembiewski & Munzenrider's Sequential Model of Burnout Development
(Cordes, Dougherty, & Blum, 1997, p.690)



Empirically, the phase model has received mixed support. Cooper, Dewe, and O'Driscoll (2001) argued that the phase levels are not entirely consistent with Golembiewski's sequential model. For example, phase VI is characterised by high emotional exhaustion despite low personal accomplishment which is supposed to be its precursor.

Table 2.2
Golembiewski Phase Model of Burnout
(Cooper, Dewe, & O'Driscoll, 2001, p. 89; Golembiewski, Munzenrider, & Carter, 1983)

Phase	Depersonalization	Personal Accomplishment	Emotional Exhaustion
I	Low	Low	Low
II	High	Low	Low
III	Low	High	Low
IV	High	High	Low
V	Low	Low	High
VI	High	Low	High
VII	Low	High	High
VIII	High	High	High

Leiter (1993) also proposed that reduced personal accomplishment develops independently of emotional exhaustion and depersonalisation rather than sequentially. A meta-analysis conducted by Lee and Ashforth (1996) supported this proposal. In contrast, other researchers supported the phase model (Burke, 1989; Burke and

Richardsen, 1993; 1996). Golembieski, Boudreau, Sun, and Luo (1998) contended that Golembiewski's model focuses on a wider perspective of stressors, more specifically, time and individual differences in the reception as well as in the coping ability against the number and intensity of stressors. A study by Cordes, Dougherty, and Blum (1997) found that the intertemporal sequence of the models by Leiter and Maslach (Figure 2.6) fitted their data better than the one by Golembiewski and Munzenrider (Figure 2.7), suggesting that the differences between the two models should not be considered trivial.

4. Lee and Ashforth's model (1993) proposed that elevated levels of emotional exhaustion directly evoked decreases in personal accomplishment rather than indirectly through depersonalization. Therefore, in line with the argument put forward by Maslach et al. (2001), it is difficult to gain a sense of accomplishment when feeling exhausted. Lee and Ashforth (1993) compared the model of Leiter and Maslach (1988) with that by Golembiewski et al. (1983). Indeed, exploratory analysis resulted in a variation on the Leiter and Maslach model, so much so that although emotional exhaustion was positively related to depersonalization (as in the Leiter and Maslach, and the Golembiewski et al. models), personal accomplishment developed independently from depersonalization. A review published by Taris, Le Blanc, Schaufeli, and Schreurs (2005) examined the causal relationships and time sequence among the three MBI components, and revealed that none of the seven longitudinal studies previously published provided any convincing support for any particular causal order proposed in the models discussed in this section. The same authors however published their own two longitudinal studies, thereby providing evidence for the conceptualization of burnout as a developmental process. Indeed, their studies showed that high levels of exhaustion were associated with high levels of depersonalization over time. Furthermore, higher levels of depersonalization led to higher levels of emotional exhaustion and lower levels of personal accomplishment. However, as with most fieldwork, the effects were not large enough to provide practical, as opposed to statistical, significance in the recognition of burnout. The dynamic multidimensional nature of burnout, as well as the availability of measuring instruments, explains the burgeoning literature over the past two decades. Nonetheless, there is still substantial lack of consensus on the basic definition and structure of burnout, as well as on the interrelations between MBI's dimensions. Despite this, MBI, which is available in various languages, remains the leading measure of burnout worldwide. Three versions of the MBI are available (Maslach, Jackson, & Leiter, 1996): the original version for use with professionals in the human services (MBI-HSS), an adaptation for use with educators (MBI-ES), and a new, general survey for other occupations (MBI-GS).

The one relevant to and actually utilised in this study is the MBI – Human Services Survey (Maslach & Jackson, 1981), which measures burnout as it manifests itself in staff members in human services institutions and health care occupations such as nursing, social work, psychology and ministry. The tool measures the three dimensions of burnout, and the scores can be correlated with other variables obtained from respondents, namely demographic variables, job characteristics, performance, attitude measures, and health information. Two other measurement instruments on burnout, namely Copenhagen Burnout Inventory - CBI (Kristensen et al., 2005) and Oldenburg Burnout Inventory – OLBI (Halbesleben & Demerouti, 2005) are now available. However, these instruments are still in the process of validation. Kristensen et al. (2005) claimed that unlike MBI, CBI can measure burnout in various domains as it provides separate scales for assessing personal burnout, work-related burnout, and client-related burnout. Furthermore, these authors argued that burnout primarily consists of fatigue, which is at par with exhaustion, but does not include the other two dimensions, which is to say, depersonalization and reduced personal accomplishment. On the other hand, Halbesleben and Demerouti (2005), described the psychometric properties of OLBI, which conceptualizes burnout as characterized by the cognitive and physical components of exhaustion, as well as by disengagement – the counterpart of depersonalization in MBI. Finally, Schaufeli and Taris, (2005) defended the conceptualization of burnout in the three-dimensional MBI, claiming that burnout is specifically work-related. Additionally, they argued that although the three components can be studied separately, burnout could be also considered as a syndrome characterized by these three manifestations.

2.3.2 The Conceptual Link of Burnout with Demand Control (Support) Model

The multidimensional theory conceptualizes burnout as "an individual stress experience embedded in a context of complex social relationships, and it involves the person's conception of both self and others" (Maslach, 1998, p.69). This theory, therefore, identifies the individual stress experience within a social context, thereby setting the stage for the usefulness of social support in potentially preventing burnout. As already discussed, the structural model of burnout (Maslach, Jackson, & Leiter, 1996) includes social support, autonomy, and decision involvement as job resources but fails to clearly show these variables as 'buffers' or moderators in the stressor-to-strain link, as indeed, is the intention in this thesis. In a structural equation modelling investigation, involving four independent occupational samples, Schaufeli and Bakker (2004) confirmed that job resources were conceptually linked to burnout, which was in turn related to health problems and turnover intentions. The literature on burnout highlights the social work setting of human service workers or people-oriented professions (Dollard, 2002). Research that has accrued over the past twenty years provides evidence for a high incidence of burnout in the human service professions, mainly projected as the cause of chronic exposure to interpersonal stressors and difficult clients and often in complicated and sensitive situations (Brookings, Bolton, Brown, & McEvoy, 1985; Gundersen, 2001; Maslach & Jackson, 1982; Shanafelt, Bradley, Wipf, & Back, 2002; Wright & Bonett, 1997). Leiter (1992) also argued that professional and personal failure at work directly promotes burnout. Of relevance to this thesis, in part because of the similarity that they bear with the DC/S model, are the empirical studies, which show that the relationships of operational and organizational job aspects with burnout are stronger than biographical, personal (Maslach & Schaufeli, 1993; Maslach & Jackson, 1982), and client factors (Jayaratne, Himle, & Chess, 1995).

A concept put forward by Maslach and Leiter (1997) focused on the job-person fit model, which hypothesised that the mismatch between the person and the job leads to burnout. Maslach and Leiter (1997) identified six areas of mismatch that include work overload and lack of control, hence explaining the conceptual link of burnout with Karasek's demand-control model (Figure 2.1). Additionally, other areas of job-person mismatch may be described as forming part of the social environment and therefore they conceptually link with the expanded DC/S model. These are insufficient rewards, breakdown of community, absence of fairness and value conflict, which occurs when there is a mismatch between the requirements of the job and peoples' principles (Maslach & Leiter, 1997). The job-person model therefore clarifies the conceptual link between Karasek's DC/S model and Maslach's multidimensional burnout model.

Table 2.3 provides empirical evidence in favour of the conceptual link between Karasek's DC/S model and Maslach's conceptualisation of burnout.

Table 2.3
Empirical Evidence in Favour of the Conceptual Link between the Demand-Control-Support Model and Burnout in Organisational Studies

Authors (Year)	Study	Sample/ Methodology	Findings	Comments
de Jonge, Janssen, and Van Breukelen, (1996)	Testing the Demand-Control-Support Model among health-care professionals: A structural equation model.	N=249, Health care professionals/ Cross-sectional survey.	High levels of autonomy attenuate the increase of emotional exhaustion due to job demands. High levels of social support proved to attenuate the increase of emotional exhaustion due to autonomy. The main effect of autonomy on job challenge is that an increase in autonomy is accompanied by an increase in job challenge (and consequently, job involvement).	**The link between DC/S model and burnout supported.** Emotional exhaustion, as one dimension of burnout, used as a measure of strain, and in relation to Karasek's DC/S model. Low job demands and a high amount of work-related support reduce feelings of exhaustion and consequently, health complaints.
de Jonge, Dollard, Dormann, Le Blanc, and Houtman, (2000)	The demand-control model: Specific demands, specific control, and well-defined groups	N=2,485, Five human service sectors: Health care, transport, bank/ insurance, retail trade, warehouse/ Cross-sectional survey.	Job demands and job control show several interaction effects on employee well-being and health, only in specific occupational groups i.e. health, transport, and warehouse employees. High-strain jobs (high demand, low control) are conducive to ill health. Active jobs (high demands, high control) give rise to positive outcomes (i.e., job challenge, job satisfaction).	**The link between DC/S model and burnout supported.** Emotional exhaustion, psychosomatic health complaints used as measures of strain. Occupation-specific variables may moderate relationships

Table 2.3...Continued
Empirical Evidence in Favour of the Conceptual Link between the Demand-Control-Support Model and Burnout in Organisational Studies

Authors (Year)	Study	Sample/ Methodology	Findings	Comments
Dollard, Winefield, Winefield, and de Jonge (2000)	Psychosocial job strain and productivity in human service workers: A test of the demand-control-support model.	N=813, Human service workers/Cross-sectional survey.	Jobs combining high demands, low control and low support produced the lowest levels of satisfaction in workers. High demands and low supports only were associated with high depersonalisation, and high emotional exhaustion. Jobs combining high demands and high control produced the highest levels of personal accomplishment.	**The link between DC/S model and burnout supported.** Structural equation analyses showed support for additive iso-strain hypothesis. Support for additive active learning hypothesis.
Landsbergis (1988)	Occupational stress among health care workers: A test of the job demands-control model.	N=771, Hospital and nursing home employees/ Cross-sectional survey.	Job strain (job dissatisfaction, depression, psychosomatic symptoms and burnout) is significantly higher in jobs that combine high workload demands with low decision latitude. Other job characteristics (job insecurity, physical exertion, social support, hazard exposure) were also associated with strain and burnout.	**The link between DC model and burnout supported.** Supervisor and co-worker support used as measures of social support, but not entered in three-way interaction.

2.3.3 The Conceptual Link of Burnout with Other Stressors, Strains and Performance

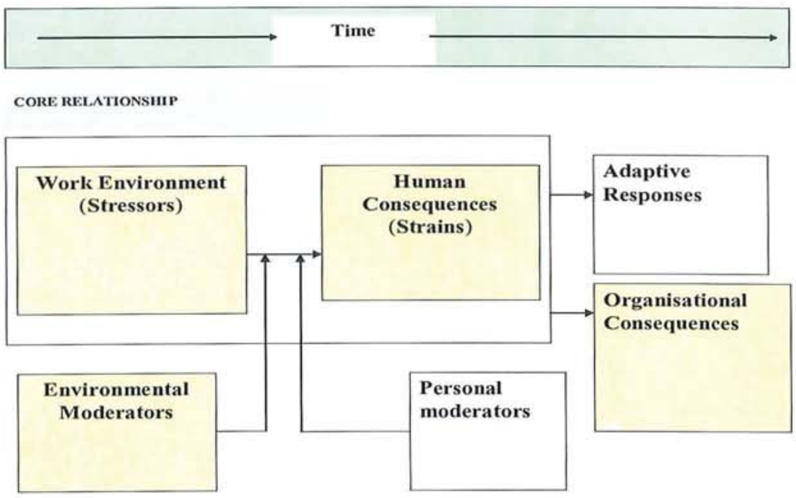
Research conducted on home care workers in Japan (Fujiwara, Tsukishima, Tsutsumi, Kawakami, & Kishi, 2003) established that conflict with clients and their families significantly related to emotional exhaustion and depersonalization of the MBI, whereas supervisory conflict significantly related to emotional exhaustion. This study also showed that co-worker conflict significantly related to depersonalization. Winstanley and Whittington (2002) found similar findings in general hospital staff in the UK, namely that emotional exhaustion and depersonalization were significantly higher in those staff reporting more frequent aggressive encounters. Additionally, these authors reported that emotional exhaustion lead directly to depersonalization as a coping mechanism, which subsequently manifested itself as a negative behavioural change towards patients.

In a systematic literature review, Michie and Williams (2003) reported evidence that sickness absence was associated with poor management style. Moreover, these authors reported that training and organisational approaches that increased participation in decision-making and problem-solving, increased support and feedback, and improved communication, led to better psychological health and lower levels of sickness absence. Of relevance to this thesis is a commentary published by Shirom (2005), who provided two insights: Firstly, he drew evidence-based arguments in favour of the contribution that burnout has in understanding the health and performance consequences of work-related stress. For example, Bekker et al. (2005) reported burnout as the most prevalent diagnosis within the category of psychological health problems in the Netherlands, and the major reason for sickness absence and work disability. In a cross-sectional study on nurses, these authors went on to discover that working hours contributed significantly to emotional exhaustion, which was in turn associated with higher levels of sickness absence. Furthermore, in the empirical study carried out by Wright and Bonett (1997) on human services personnel, a negative relationship was demonstrated between one, and only one of the three dimensions of burnout, namely emotional exhaustion, and subsequent work performance. Secondly, Shirom (2005) reaffirmed earlier assertions that the chronic nature of burnout appeared to be more work-related rather than a consequence of genetic or personality make-up.

2.3.4 Conceptual Link of the Moderated Stressor-Strain Relationships, and the Human and Organisational Consequences

Beehr (1998) described a facet model of occupational stress (Figure 2.8), showing a simple linear relationship between stresses in the workplace (*stressors*) and human psychological and physical consequences (*strains*), as being moderated by *personal* and *environmental moderators*. Additionally, this model shows the *duration facet*, which recognises the importance of time or duration that individuals are exposed to stressors. The DC/S model and the multidimensional model of burnout fit within Beehr's facet model of occupational stress.

Figure 2.8: The Facet Model of Occupational Stress (Beehr, 1998, p. 13)
(The yellow-coloured boxes indicate the variables under consideration in study two)



Therefore, in addition to the conceptual links involving DC/S and burnout already critically reviewed, I will discuss the impact that moderated work stressor-strain relationships have on performance. At the same time, I will review job satisfaction and the intention to leave as indicators of strain as part of the moderated and mediated relationships described above. Gupta and Beehr (1979), as well as Kaufmann and Beehr (1986) were among the first researchers to recognise that organisations are affected by stress on the employees, in that employees experiencing higher levels of stress were somewhat more likely to absent themselves than other employees. Additionally, Beehr, Jex, Stacy, and Murray (2000) confirmed that job stressors predicted both psychological strains and performance. Similarly, Bourbonnais and Mondor (2001) supported the association between job strain and short-term sick leaves among nurses in the province of Québec. However, these authors did not support the moderating hypothesis of social support at work in the relationship between job strain and absence from work. Baruch-Feldman, Brondolo, Ben-Dayan, and Schwartz (2002) showed a positive relationship between social support and job satisfaction, particularly immediate supervisor support, which was related to increasing productivity and job satisfaction, but not to reducing burnout. Specifically in health care settings, Bradley and Cartwright (2002) found that perceived organizational support is related to better nurses' health and job satisfaction. Borrill and West (2003) found empirical evidence of the conceptual link between sophistication and extensiveness of staff management practices in NHS hospitals, which included appraisal systems, staff training policies, teamwork, and supervisor support with higher job satisfaction, a decreased intention to leave a job and lower mortality rates – an objective indicator of hospital performance.

The conceptual framework of study two is similar to that proposed by Beehr, except that I have focused on just the environmental moderators (social support and decision latitude/control) and the organisational consequences (hospital unit performance) and not on the personal moderators or the adaptive responses. Furthermore, the duration facet confirms the necessity for future longitudinal research to confirm direction of causality in the conceptual model.

2.4 The Social Support and Social Influence Theories

The theoretical bases for the stress-buffering model and sources of social support in the stressor-strain relationship are derived from the field of social psychology namely, the social support and social influence theories.

The social support theory is based on the concept that social ties facilitate giving and receiving assistance within relationships, while coping with stressful life events, thereby safeguarding health and well-being. The impact of social support on the stressor-strain relationship can be manifested in three ways (Cooper, Dewe, & O'Driscoll, 2001) that is as a main effect, as a mediator, or as a moderator. As a main effect (Quick, Quick, Nelson, & Hurrell, 1997), an increase in social support results in reduced levels of strain, irrespective of the quantity and quality of job stressors. This occurs through the influence of social acceptance on self-esteem that has a positive impact on well-being (Cohen & Wills, 1985; Fenlason & Beehr, 1994). A review of cross-sectional, case control and prospective studies, which were published between 1985 and 2003, investigated the association between social support inequalities experienced at work (e.g. poor communication channels, unsatisfactory work relationships, unsupportive organizational culture) and work-related musculoskeletal ill-health. The findings provided good evidence for an association between poor social support and increased risk in musculoskeletal morbidity, and sickness absence (Woods, 2005). When social support acts as a mediator (Baron & Kenny, 1986), it represents a generative mechanism through which stressors will influence strains (Cooper, Dewe, &

O'Driscoll, 2001). Social support as a moderator, on the other hand, may influence the stressor-strain relationship by altering the cognitive judgement of the stressor or by reducing/buffering health damaging psychological processes (Quick et al., 1997). Therefore, in this regard, the relationship between stressors and strains will differ depending on the degree of support available. In their study conducted in the military context, Bliese & Britt (2001) adopted social support as a moderator, in a cross-sectional study involving 2,273 US army soldiers, and concluded that individuals in positive social environments would show lower levels of strain when exposed to stressors than would individuals in negative social environments. Positive shared social environment, which was measured through group consensus on group leadership, moderated relationships between work stressors and morale, as well as between work stressors and depression. These results supported the hypothesis that positive social environments help individuals cope with stressors.

In the organisational field, House (1981) referred to four types of support, namely: instrumental support, by offering direct and practical help; emotional support, by showing an interest in and understanding of problems; informational support, by providing others with useful information and knowledge, and as appraisal support, by giving adequate feedback on performance that may influence a person's self-esteem. From the functional point of view, therefore, social support includes assistance with the acquisition of resources, access to new and diverse information, as well as guidance and advice particularly in complex and unusual circumstances. Furthermore, social support provides a sense of belonging to a group or organisation and helps individuals with their self-esteem (Quick et al., 1997). Therefore, application of social support theory necessitates the transfer of support through caring exchanges so that individual's sense of belonging and esteem are elevated. These functions overlap with effective leadership behaviours as described by Yukl (2002). Quick et al. (1997, p.198) listed "supervisor" as an organizational source of support in the social support network. In this context, leadership is the major role of the supervisor. Indeed, leadership is a powerful source of support that contributes to buffering through the provision of information, support, and esteem (Quick et al., 1997). Similarly, cohesion, cooperation, communication, and supportive relationships are well defined in group dynamics and effective team working (Borrill et al., 2001; Heinemann & Zeiss, 2002; Quick et al., 1997). As groups become teams, these elements become much stronger thereby enabling teams to become task specific (Adair, 1988; Katzenbach & Smith, 1993) while also allowing team members to be interdependent (Schein, 1988; Hackman, 1990; 2002; Belbin, 1993).

Social influence is defined as "*a change in the judgements, opinions, and attitudes of individuals as a result of being exposed to the views of others*" (Van Avermaet, 2001, p. 404). The broad line of research represented by social influence theory lies in the classical tradition of group dynamics. This involves the formal modelling of interpersonal influence processes as played out in a social network. Social influence plays an important part of everyday life and includes attempts by individuals to change the attitudes and/or behaviours of others such as through persuasion, making requests, or exerting authority. The two major mechanisms through which groups influence members are informational influence based on the informational value of opinions expressed by others about an aspect of reality, and normative influence based on the need to be accepted and approved by others (Van Avermaet, 2001). Social influence can also include subtle processes that occur within groups such as conformity to the implied standards (norms) of specific social groups. Furthermore, social influence firmly forms part of the functional role of leadership. Based on the social support and social influence theories, Bliese and Britt (2001) identified consensus on group leadership in the military setting as a social context matter of importance to the group of soldiers and therefore provided a basis to measure the quality of the social environment. Thus, these authors used both leadership and group dynamics to develop strong indicators of the quality of the social environment.

2.5 Multilevel Perspective of the Stressor-Strain Relationship in Work Settings

Stress research has evolved over the years from that mostly focused on the individual to one that also incorporates organisational and extra-organisational antecedents. Koslowsky (1998) emphasised that the degree to which organisational and extra-organisational indicators influence stress at the individual level is determined by the organisational structure, and therefore by constructs intended beyond the individual level of analysis. Indeed, Koslowsky (1998) recognised that stress and the intervening moderator and mediator variables have multilevel sources, so much so that failure to gauge the work setting's total environment would result in missing the critical elements in the stressor-strain process. Furthermore, the research design may dictate the need to consider the group rather than the individual, as does the research design in the second study of this thesis. For example, Van der Velde and Class (1995) attempted to study the impact of role ambiguity, role conflict, and organisational climate on organisational stress. However, despite recognising the different levels at which variables were meaningful, they failed to use multilevel techniques that would recognise the different levels. Research carried out in recent years has become increasingly accurate both in terms of defining levels at which variables are meaningful, as well as in terms of analysis.

Bliese and Jex (2002) argued that incorporating a multilevel perspective in occupational stress has both theoretical and practical values in that individual behaviour is a reflection of the complex interactions within the person-environment fit. These authors indicated that occupational stress research shows divergent philosophical views, firstly, an ontological assumption of nominalism (reality is created by individual), and secondly, that of realism, which assumes that life events are stressful for all individuals. Indeed, these authors argued that multilevel models of occupational stress unify the divergent assumptions of nominalism and realism into a combined model in an attempt to gain a greater understanding of occupational stress that would assist organisations to reduce employee stressors.

Bliese and Britt (2001) published multilevel research on stressor-strain relationships in the US military by examining the degree to which by the quality of their shared social environments influenced individuals' reactions to stressors. Indeed these authors found that the quality of social environment, which was meaningful at the higher level, moderated the relationships between work stressors and morale, as well as between work stressors and depression. Multilevel research on occupational stress is still developing. There is no doubt that the DC, DC/S, JD-R models and burnout featured prominently in the literature over the last two decades. This thesis however aims to contribute to the body of literature on these models by utilising multilevel modelling, researching a wider array of stressors and strains, as well as by exploring the link with performance management.

2.6 Multilevel Perspective of Social Support and Decision Latitude/Control

Bliese and Castro (2000) argued in favour of considering social support as a macro characteristic of the work-group environment and therefore, were among the first to provide a multilevel perspective to the demand-control/support model. More recently, Thomas, Bliese and Jex (2005) also conceptualised and modelled support as a shared group attribute. In study two, conceptually, the shared group level properties of social support can be explained very well through the supportive climate that transformational leaders create in their units. The characteristics of the transformational leaders, namely inspirational communication, intellectual stimulation, and supportive leadership provide the right ingredients for a supportive climate. Moreover, teams become well-functioning when synergy is reached as a result of the climate of support provided by team members. On this line of reasoning, Jex and Bliese (1999) provided a contextual perspective of collective efficacy as a moderator of work stressor-strain relationships within the context of group dynamics rather than teams. Team dynamics provide a stronger climate of social support than groups (Borrill et al., 2001) and therefore, provide a stronger argument in favour of a contextual level of social support.

To my knowledge, the conceptualisation of decision latitude/control as a group-level variable is not well-documented in the literature. Study two seeks to provide an innovative perspective to decision latitude/control, in its conceptualisation as a macro characteristic of the work-group environment. This means that the positive climate, which is created by both transformational leadership and team dynamics, allows macro-level decision latitude/control to be exercised, in terms of long-term, broad-ranged control. Therefore, the freedom to act using a range of skills occurs within the context of the social structures in which the team makes its social investment. If this freedom is lacking, macro-level decision latitude/control would be absent.

2.7 Chapter Summary and Conclusion

In this chapter, I focused primarily on the principal link between work stressors and strain. I also critically reviewed the literature on the moderator hypothesis of the stressor-strain relationship, as supported by Karasek's DC/S model as well as the mediator hypothesis, as supported by Maslach's multidimensional burnout model. Furthermore, in this chapter, I critically reviewed the various conceptual links in the hypothesised relationships by providing the empirical evidence that supports these links. At the same time, through the social support and social influence theories, this chapter provides the conceptual link with transformational leadership and team climate, a link that will be discussed and reviewed in detail in chapter three.

CHAPTER THREE

LEADERSHIP AND TEAM CLIMATE AND THEIR ASSOCIATION WITH SOCIAL SUPPORT, CONTROL, AND PERFORMANCE: A CRITICAL REVIEW OF THE LITERATURE

3.1 Introduction

This chapter will review transformational leadership and team climate, both separately and together, in the context of a shared social environment. Secondly, it will review the literature on linking transformational leadership and team climate with the other variables in the conceptual framework.

In the next section, I will first concentrate on the conceptual link of leadership and team climate, with the stressor-to-strain relationships, which I have critically reviewed in chapter two. The next section will therefore link this chapter with the previous one.

3.2 The Conceptual Link of Leadership and Team Climate in a Shared Multiprofessional Environment, with Stressor-Strain Relationship

Organisations are increasingly focusing on leadership and teamwork to improve performance (Alimo-Metcalfe & Lawler, 2001; Ancona & Caldwell, 1992). At the organisational level, leaders build the organisation with resources and energise people to achieve goals. At the process level, leaders strive to remove unnecessary complexity, and at the practitioner level, they are increasingly adopting team working by changing the design and administration of individual roles.

For health care organisations to be successful over a long period, they need to invest in leadership development and in team building processes (Gorman, 1998; Payne, 2000). Firth-Cozens and Mowbray (2001) argued that leadership development programmes must address the complexities of health care. Wilderspin and Bevan (2006) claimed that although development of these processes may not show dividends in the short-term, unless organisations are re-engineered in a comprehensive way, any short-term successes will be short-lived and their roots shallow. Indeed, despite the fact that well-performing teams working in isolation can achieve good outcomes, consistency in maintaining optimal performance in time and across the whole organisation requires an entirely well functioning organisation.

Secondary health care presents a complex and challenging environment characterised by "rapidly-evolving, ambiguous situations; complex, multi-component decisions; information overload; severe time pressures; and performance/command pressures" (Salas, Sims, Klein, & Burke, 2003; p.5). These pressures are all environmental stressors that health care professionals face on a day-to-day basis.

As stated in the introductory chapter, there is zero tolerance to error in health care. Indeed, over the past fifteen years, a wave of litigation lawsuits on medical malpractice and errors hit health care (Groff, 2003; Mann, 2003). There is no doubt that health professionals and their organisations strive to keep their image clean and to avoid negligence. Furthermore, medical journals repeatedly linked working under conditions of *stress* with medical errors (Sexton, Thomas, & Helmreich, 2000), the awareness of which is increasing worldwide because of better access to education and information. This means that those working in highly stressful climates are more prone to mistakes which, once committed, will lead to more stress because of the resulting consequences from these errors (Jones et al., 1988). Researchers in quality assurance focused on finding empirical evidence in favour of ways that help reduce medical error. For example, Reinertsen (2001) emphasised that healthcare leaders must assume responsibility for closing the *holes* in their organisations. Ovretveit (2005) argued for the need to engage clinicians, and not just senior leaders, in assuming a leadership role for improving health care provision. The author acknowledged a lack of evidence-based materials for education programmes for leaders and also for the ways in which the leader role differs according to the type of context, the level and type of leader, and the level of quality control and improvement methods. Reason (2000) created a model (Figure 3.1) *the Swiss cheese model of defences*, illustrating how an accident trajectory may penetrate safeguards, thereby advocating the need for multiple layers of barriers to ensure better success at minimising error.

Figure 3.1: The Swiss Cheese Model (Reason, 2000)

When the health service is less well organised in terms of leadership and team working, there is a greater possibility that these defences may fail, resulting in medical error (Reason, 2000). Therefore, contextual factors, such as effective leadership and team working, as well as adequate supervisor/co-worker support, buffer health care professionals against work stressors (Van Yperen & Hagedoorn, 2003; West et al., 2003). Additionally, adequate supervision and team working results in better quality control and contributes towards the adoption of a holistic approach towards care, thereby ensuring completeness in the management of patients (Langford, Bowsher, Maloney, & Lillis, 1997). The work practices created would therefore help in blocking the holes in the Swiss cheese metaphor.

Organisations are assuming greater responsibilities and, as a result, they are changing their culture from one which blames individuals for errors to one which improves their systems and organisational behaviour. According to the Institute of Medicine (2001), health organisations are determined to offer a safer health system. The Report on the NHS National Staff Survey (2004) referred to *High Reliability Organisations* (Vogus & Welbourne, 2003; Waller & Roberts, 2003) as one which focuses on errors and near misses. Indeed, such organisations consider these situations as opportunities for learning. Therefore, if one considers the health service as a service with high reliability organisations, reports of errors and near misses, as well as the exposure of health care professionals to prequalification training in error management should be encouraged. This in turn gives confidence to health care professionals who are encouraged to come forward with new ideas that may result in innovations for prevention, thereby adding more barriers to the Swiss Cheese Metaphor.

What emerges clearly from the literature is that there is a buffering effect of the stressor-strain relationship, resulting from the quality of the social environment (Bliese & Britt, 2001; Bliese & Castro, 2000). Supervisor and co-worker support are also widely mentioned as moderators of this relationship (Beehr, Jex, Stacy, & Murray, 2000; Bradley & Cartwright, 2002; Ducharme & Martin, 2000; Fenlason & Beehr, 1994; Fujiwara, Tsukishima, Tsutsumi, Kawakami, & Kishi, 2003; Woods, 2005) and are essential to the development of sustainable inter-personal networks. Social support and social networking are distinct but related concepts. Formal and informal networking is critical in open team working in multiprofessional health care, as well as in effective leadership within and between teams (Berkman & Syme, 1979; Payne, 2000; Van Yperen & Hagedoorn, 2003).

O'Driscoll and Beehr (1994) found that supervisors influence the degree of role stress and uncertainty perceived by subordinates, which in turn affects levels of satisfaction, strain, and turnover intentions. Therefore, in view of the fact that supervisor support forms part of the leadership process (Yukl, 2002), one can argue that effective leadership affects the quality of the social environment and ultimately the performance of individuals, not to mention the outcome measures.

Of relevance to this thesis is the finding by Borrill and West (2003), of a strong association in NHS hospitals between sophistication and extensiveness of staff management practices, which included leadership clarity and effective team working, and lower patient mortality.

The advantage of working together in teams with effective leadership is the co-ordinated communication, collaboration, and cohesion between members that maximises social support, safeguards the health and well-being of health care professionals and at the same time minimises error.

3.3 Leadership

There are several schools of thought regarding leadership, and major differences remain between leadership in theory and in practice. Indeed, the concept of leadership has attracted interest by historians, theorists, and researchers across different contexts.

Leadership is a priority for research and development as part of NHS reforms in the UK (Alimo-Metcalfe & Lawler, 2001; Goodwin 2003). Furthermore, health care organisations are complex, so much so that they require effective, creative, and adaptive leadership to answer to the fast changes in care, demands, and technologies (Plsek & Wilson, 2001).

This thesis, by means of its two studies, deals with two organisational levels of leadership, namely senior management leadership at the NHS Trust level in study one, and leadership at the NHS hospital unit/ward-level in study two. Despite the abundant literature on leadership, there exists an ongoing debate on what constitutes a clear definition of leadership, and an even greater debate on what constitutes effective or optimal leadership (Yukl, 2002).

In 1978, Burns noted that no focal concept on leadership emerged, despite the burgeoning literature on the subject. Likewise, Yukl (2002) echoed that researchers' methodological preferences and definitions largely determined the study of leadership. The main reason, according to Burns, was that scholars coming from different disciplines attempted to answer specific questions unique to their discipline. Indeed, based on work conducted in the field of humanistic psychology, Burns paved the way for the emergence of the concept of transformational leadership which, he claimed, is possible to generalise across time and cultures. Furthermore, Burns claimed that effective leaders are the ones capable of creating social changes.

Study one focuses on the quality of senior management leadership, and therefore on leadership at the highest organisational level. This is in contrast to study two, which focuses on unit-level leadership and therefore on leadership at a lower organisational level. Ovretveit (2005) emphasized that leadership development should occur across different levels within the organisation to ensure improvement in quality and performance.

The five items measuring the quality of senior management leadership in study one, adapted from the NHS Survey (2004) probed followers on their senior management leader's vision, support for new ideas, focus on patients' needs, and relationships with stakeholders. These items measured similar qualities in leadership as those found in the sub-dimensions of transformational leadership.

Indeed, transformational leadership has emerged as one of the most frequently studied theories of leadership and is specifically the underlying theory adopted in study two. Empirical evidence suggests that transformational leaders have positive effects on trust, commitment, team efficacy and effectiveness, and organisational effectiveness (Arnold, Barling, & Kelloway, 2001; Bass & Avolio, 1994; Özaralli, 2003) as well as on subordinate performance (McColl-Kennedy & Anderson, 2002).

I will first discuss the distinction between senior management leadership and unit-level leadership as two distinct organisational levels of leadership before moving on to a critique of the literature on transformational leadership.

3.3.1 Senior Management Leadership versus Unit-Level Leadership

Qualitative differences exist in the nature of leadership at different organisational levels, which require specific leadership behaviours (Zaccaro, 2001). Two major hierarchical organisational models describe the various leadership skills or behaviours at distinct organisational levels. The first model by Katz (1955) categorises skills at various levels of leadership responsibility, namely technical for immediate task accomplishment, human for interpersonal communication, and conceptual for abstract thinking. Katz proposed that the higher the organisational level of leadership, the lower the need for technical skills, the higher the importance of conceptual skills, whereas the need for human skills remains constant. The second model is the Stratified Systems Theory, which proposes that organisations have seven different levels grouped into three domains (Jacobs & Jacques, 1987). The systems domain is the highest, followed by the organisational and the production domains. Within each domain, there are two to three levels as illustrated in Appendix 11. The tasks become more complex the higher the level within the organisation.

Specifically within UK NHS Trusts, Borrill, West, and Dawson (2005) identified two main levels of leadership namely, senior management leadership for setting the strategic direction, and leadership at the level of the hospital units/wards/medical firms, for line management and staff supervision. Leadership at all levels must be complimentary with the assurance that there is a strategic fit across the organisation in terms of the decisions taken, the achievement of objectives, the support, well-being and motivation of hospital employees, and the quality of care delivered. Therefore, the abilities of senior management leaders to promote organisational performance and those of hospital unit-level leaders to promote individual and group performance are indicators of effective or optimal leadership (Yukl, 2002). This does not mean that there is a dichotomy between the two levels in terms of how they promote performance.

Indeed, Wilderspin and Bevan (2006) argued that effective senior leadership is essential to maintain organisation-wide performance and initiate organization-wide change. However, replication of these senior leadership skills needs to occur throughout the organisation for the spread and maintenance of both performance and change. These authors equally emphasised the need for health care organisations to promote clinical apart from managerial leadership. Indeed, they also stressed the need for both types of leaders to co-operate and lead the change.

The two studies in this thesis propose that there is a relationship between quality of leadership (irrespective of the level and type), and social support as perceived by hospital employees. Additionally, the two studies also propose the existence of a relationship with job design (that includes decision latitude/control) in study one and specifically with decision latitude/control in study two.

When senior management leadership organises itself as a team, the members oversee the diverse organisational functions while supporting the hospital unit-level leaders (Borrill, West, Dawson, 2005). Furthermore, senior management leadership may only ensure optimal organisational performance if the complex rapidly changing external environment is carefully monitored and addressed. The literature provides evidence that when senior management leadership has the vision that encompasses a comprehensive strategy, incorporating both external and internal activities, organisational performance improves (Ancona & Caldwell, 1992).

Specific to health care, research carried out by the Aston team (2005) on a large sample of 23,720 staff across 134 UK NHS trusts, revealed a significant and positive relationship between senior management leadership and trust star ratings, as well as clinical governance review ratings across trusts. This research also revealed that the more effective senior leadership predicted lower levels of patient complaints. This finding was the result of the impact that senior management leadership had on the creation of a climate of shared values that nurtured openness, trust, and participation (West, Borrill, & Unsworth, 1998).

In this thesis, study one proposes that a positive climate improves the perceptions of social support and empowerment in decision-making (as part of the job design), which the top management passes on to the hospital employees that have direct patient contact. This explains the proposed relationship between quality of senior management leadership and social support/job design. The measurement of social support in this study includes both supervisor and co-worker support, hence assuming that the climate of support from top management prompts supervisors to offer their support to front-liners, who then maintain the network of social support among themselves.

Study two in this thesis specifically focuses on transformational leadership at the level of hospital units/teams/groups. The study by the Aston group of researchers (2005) revealed that effective immediate supervisor/manager leadership predicted overall clinical governance review ratings, as well as ratings in relation to staffing and management, risk management, staff satisfaction and lower intention to leave job. In another study involving 136 primary health care teams, both participative and directive leadership styles were positively associated with team reflection, which stimulated performance and innovation in high functionally heterogonous teams for participative leadership, and in low functional heterogeneity for directive leadership (Somech, 2006).

The role of leadership at this level is crucial in influencing individual and group performance by clarifying objectives that have a strategic fit with organisational vision and objectives (Tannenbaum, Salas, & Cannon-Bowers, 1996), and also by creating a climate of (team) support, expertise, and positive attitudes (McIntyre & Salas, 1995). The leadership roles and responsibilities at unit level enable front-line hospital employees to make the right decisions and successfully achieve optimal health care results for the benefit of the patients and society.

A review of the literature on leadership theories (Northouse, 2001) reveals an evolution from the "Great Man" and "Trait" theories (p.15) to Transactional" and "Transformational Leadership" (p.131), which is considered part of the "New Leadership" paradigm (Bass, 1996; Bryman, 1992). Appendix 12 provides an overview of the chronology of the major leadership theories.

In the next section, I will focus on transformational leadership that enables leaders to provide support and to influence decision-making at the hospital unit level and ultimately to influence the level of unit performance.

3.3.2 Transformational versus Transactional Leadership

Among the first to contrast transformational and transactional leadership is Burns (1978). However, the lack of empirical evidence in Burns' work prompted Bass, Avolio and colleagues to carry out scientific research in the area that resulted in numerous publications by these authors as from 1985. Waldman, Bass, and Yammarino (1990) claimed that transformational leadership enhances rather than replaces the usefulness of transactional leadership. In fact, theoretical and empirical distinctions exist between the two, as will be explained in this section.

Transactional leaders exchange praise, rewards, and resources with their followers. Furthermore, they inform their followers that to avoid disciplinary action they must concur with, acknowledge, or obey them (Bass, Avolio, Jung, & Berson, 2003).

Therefore, transactional leadership focuses on completing the tasks and on sustaining working relationships through the exchange of rewards. This style of leadership implies close supervision for errors, inaccuracies, and unacceptable behaviour as well as an immediate response through corrective action (Bass et al., 2003).

In contrast, transformational leadership seeks to motivate followers to reach high levels of performance by transforming followers' knowledge, attitudes, beliefs and values rather than just simply gaining compliance (Bass, 1985). Rowold and Heinitz (2007) found that transformational leadership contributed unique variance to subjective performance, and had an impact on profit, over and above transactional leadership.

One may argue that in hospital practice, transactional leadership is more suitable to avoid medical errors and enhance patient safety. However, this style of leadership has negative characteristics that do not appear to fit in with the concept of nurturing team climate, providing social support, and enabling decision latitude/control. For example, transactional leaders do not strive to individualise the needs of followers nor do they prioritise on their personal development (Northouse, 2001), but rather they influence followers to believe that it is in their best interest to follow their leader without question (Kuhnert & Lewis, 1987). Furthermore, this influence on followers may also diminish the latitude and control over decision-making, as defined in Karasek's DC/S model.

Another characteristic of transactional leadership, which is not conducive to creating a team climate, is that leaders may punish followers for failing to comply with specific instructions (Bass et al., 2003). One may argue that this is necessary in health care to enforce discipline, and therefore to avoid medical errors that may result from the adoption of a lax attitude. However, working under the threat of being 'punished' may not be conducive to a reflective social environment and may drive professionals to practise 'defensive' medicine (Studdert et al., 2005).

Transactional leadership incorporates two factors, namely positive reinforcement by contingent reward and negative reinforcement in terms of management-by-exception that can take an active or a passive form (Avolio, 1999; Bass & Avolio, 1994). In active management-by-exception, the leader takes a corrective form, specifies standards for compliance, and also defines what constitutes ineffective performance. In the passive form, the leader intervenes only after problems surface (Northouse, 2001). On the other hand, transformational leadership theory focuses on the effects that leaders have on followers. There are several positive characteristics in transformational leadership that makes it suitable for health care.

First, health care professionals often have to perform beyond expectations, particularly in moments of high demands, emergencies, or national disasters. The transformational leader supports followers to invest in further effort and to achieve more than their norm (Arnold, Barling, & Kelloway, 2001) thereby raising one another to a higher level of motivation. Achieving this state requires followers to identify themselves as sharing the same values and meanings as their leader (Burns, 1978; Bass, 1985; 1992; 1998).

Indeed, transformational leaders aim at influencing changes in the behaviour of followers, while encouraging and fostering commitment for the organisation's strategies (Bass et al., 2003). For example, the transformational leader in the health service seeks to make health care professionals more aware of the importance of quality of care and patient safety to the extent of inducing them to rise above their own self-interest for the sake of the patient (Yukl, 1999). Furthermore, Bass (1985) referred to transformational leadership as adaptive and flexible, and indeed, as more responsive to the challenges that frequently arise in health services.

Second, it pays health care organisations to buffer their employees against stress. In fact, according to Smith and Cooper (1994), transformational leadership reduces the stressor levels of followers, and therefore, it appears to be a source of social support. As a result, by safeguarding the well-being of followers, as well as aiming to achieve high quality of care delivery, transformational leadership appears to honour the criteria for health care effectiveness as an outcome of successful, hence, effective leadership.

In support to this line of argument, Yukl (1999) linked transformational leadership with the nature of effective leadership. However, he contended that existing conceptual weaknesses still limit the capacity of transformational leadership to explain effective leadership comprehensively. Among these weaknesses are ambiguous constructs, insufficient description of explained processes, and insufficient specification of limiting conditions in the form of situational variables.

Most factor studies support the distinction between transformational and transactional leadership. However, in some studies positive reward behaviour loads on transformational rather than transactional leadership, while laissez-faire leadership and passive management by exception form a separate factor rather than loading on transactional leadership (Yukl, 1999). This appears to fit into the logic of the "two-factor theory" of leadership by Bass and Avolio (1988) that transformational and transactional leadership build on one another and that an optimal leader practices the transformational components more frequently and the transactional components less frequently.

3.3.3 The Sub-dimensions of Transformational Leadership and Relationship with Social Support and Decision Latitude/Control

Bass and colleagues (Bass, 1985, 1995; Bass, Avolio, Jung, & Berson, 2003) identified four components of transformational leadership, known as the 4I's, namely idealized influence, inspiritational motivation, intellectual stimulation, and individualized consideration. Arguing that there is lack of empirical support for Bass's four-factor structure of transformational leadership, Rafferty and Griffin (2004) proposed five sub-dimensions, which they claim are more focused than, yet emerging from, those by Bass, despite the fact that they emerge from such a structure.

Consequently, rather than contrasting Bass's highly popular 4I's, Rafferty and Griffin (2004) sought to address some of the conceptual weaknesses identified by Yukl (2002), and to clarify the definitions of each sub-dimension. Furthermore, of relevance to this thesis, the five sub-dimensions are highly consistent with House's (1981) four types of social support, as will be discussed in this section.

Additionally, the five sub-dimensions of transformational leadership are conducive to the creation of a social environment that supports Karasek's decision latitude/control (1979) in stimulating more empowerment in decision-making. I will define the five sub-dimensions by Rafferty & Griffin (2004) as replacing Bass's four components (in brackets marking the I of the 4I's as bold) and I will relate these to the four types of social support as defined by House.

Furthermore, the social influence theory (Van Avermaet, 2001) consolidates the theoretical link of leadership with social support and decision latitude/control. It also accounts for the attempts by leaders to influence their followers in their behaviour and to make the right decisions by offering various forms of support. This rationale provides the theoretical underpinning of the first groups of hypotheses in both studies. The five sub-dimensions of transformational leadership are:

1. *Vision* (Charismatic Leadership or ***Idealized influence***), is "the expression of an idealized picture of the futures based around organisational values" (Rafferty & Griffin, 2004, p.332). Followers like, value, and depend on their leaders, who in turn adhere to their ethical principles. Leaders are willing to share risks with and consider needs of their followers, who in turn identify with and want to imitate their leaders. Through vision, transformational leaders offer instrumental and emotional support, as well as create the climate conducive to more freedom in decision-making. While charismatic leadership is a sub-dimension of transformational leadership in Bass and Avolio's work, other authors have developed charismatic leadership as a related yet distinct theory to transformational leadership (Rowold & Heinitz, 2007).

2. *Inspirational communication* (***Inspirational motivation***) is "the expression of positive and encouraging messages about the organisation and statements that build motivation and confidence" (Rafferty & Griffin, 2004, p.332). Therefore, transformational leadership assumes that people will follow the leader who inspires them. This sub-dimension is consistent with all four types of House's support – leaders motivate their followers by valuing and at the same time challenging their follower's work. Leaders support followers and urge them to work towards a clear vision and provide a sense of mission. They display enthusiasm and optimism which stimulates individual and team spirit. The impact of the leader's inspiration and communication is that followers may be more creative in their decision-making, resulting in greater latitude. This makes transformational leadership a

strong theoretical underpinning of leadership in teams (Arnold, Barling, & Kelloway, 2001; Özaralli, 2003).

3. *Intellectual stimulation* (*Intellectual stimulation)* is defined as "enhancing employees' interest in, awareness of problems, and increasing their ability to think about problems in new ways" (Bass, 1985; Rafferty & Griffin, 2004, p.333). The transformational leader assumes that the way to get things done is by injecting enthusiasm and energy. Leaders encourage followers to be creative and innovative by offering instrumental, emotional, and informational support and instilling pride, faith, and respect. There is constructive criticism of individual members' mistakes by offering appraisal support. By intellectually stimulating their followers, the transformational leader prompts followers to be more creative in their decisions. Furthermore, transformational leaders tend to include their followers' problems in the process of finding solutions.
4. *Supportive leadership* (*Individualized consideration*) is defined as "expressing concern for followers and taking account of their individual needs" (Bass, 1985; Rafferty & Griffin, 2004, p.333). Leaders create new learning opportunities in a supportive climate, thereby allowing followers to develop a higher level of potential and better ability in taking decisions. They pay attention to followers' needs and recognise individual differences by acting as a coach or mentor.
5. *Personal recognition* is "the provision of rewards such as praise and acknowledgement of effort for achievement of specified goals" (Rafferty & Griffin, 2004, p.334). The high positive correlation between contingent reward in transactional leadership, and this fifth dimension, found by these authors links transactional with transformational leadership. Rafferty and Griffin (2004) argued

that the use of the term *personal recognition* captures the aspect of contingent reward that is conceptually related to transformational leadership in that the leader values followers' efforts and rewards behaviour that promotes the organisation's vision.

Rafferty and Griffin (2004) demonstrated that although the five sub-dimensions are inter-correlated, they are distinct in their relationships with a number of measured outcomes. Furthermore, the discussion in this section reinforces the conceptual link between social support, as defined by House (1981), and the components of transformational leadership, as conceptualised by Bass (1985), and Rafferty and Griffin (2004).

Additionally, the five sub-dimensions (Rafferty & Griffin, 2004) spell out how the transformational leader strives to allow and indeed support followers in their participation in decision-making, thereby leading to greater decision latitude/control by followers.

One may argue that leaders often select team members in assuming greater decision-making freedom rather than empowering the whole team. However, the *Attraction-Selection-Attrition* framework (Schneider, Goldsten & Smith, 1995) suggests that over time organisations and indeed teams become progressively more homogeneous, as similar people will stay while dissimilar ones will leave.

In the next sections, I will describe the published psychometrically validated and published scales of transformational leadership. Based on these measures, I will argue in favour of my choice to utilise the Rafferty and Griffin (2004) scale.

3.3.4 Measurement of Transformational Leadership

Bass's conception (1985) of transformational and transactional leadership was operationalised through his development of *The Multifactor Leadership Questionnaire* (MLQ), which measures transformational leadership, as well as three transactional factors (contingent reward, active management by exception, and passive management by exception) and laissez faire (Bass & Avolio, 1995). Together with Avolio (1999), Bass continued to develop this tool further as part of *Full Range Leadership Program* that includes MLQ assessment, feedback, and leadership coaching (Avolio, 1999; Bass, 2000). Antonakis (2001) validated the tool as appropriate to use in different contexts. Podsakoff, MacKenzie, Moorman, and Fetter (1990) developed a self-assessment questionnaire (Pierce & Newstrom, 2003, p. 331-332) designed to measure six transformational leader behaviours (Articulating a Vision, Providing an Appropriate Model, Fostering the Acceptance of Group Goals, High Performance Expectations, Individualized Support, and Intellectual Stimulation), one transactional leader behaviour (Contingent Reward Behaviour), as well as employees' trust in their leader, and satisfaction.

Rafferty and Griffin (2004), on the other hand, developed a tool that captures the five sub-dimensions, which fit better in the conceptual framework of this thesis. These authors argued that there is ambiguity and lack of discriminate validity between the four dimensions of transformational leadership as proposed by Bass (1985). Based on these arguments, the Rafferty and Griffin (2004) provided the assessment instrument on transformational leadership in study two, as it appears to fit the theoretical framework of study two more adequately.

3.3.5 Empirical Evidence in Favour of Transformational Leadership

A significant body of empirical research that also includes two meta-analyses on transformational leadership has revealed encouraging results as shown in Table 3.1. Rafferty and Griffin (2004) demonstrated a variety of relationships between sub-dimensions of transformational leadership and several outcome variables. Meaningful relationships were found between inspirational communication and role breadth self-efficacy, affective commitment, and interpersonal helping, whereas intellectual stimulation was found to be related to affective and continuance commitment to the organisation.

Moreover, these authors found surprising negative associations between vision and continuance commitment, and between personal recognition and continuance commitment. Importantly enough, supportive leadership did not display any significant unique relationships with the outcome variables. Hence, the authors encouraged the use of these dimensions separately in contrast to other studies, which tended to examine a higher-order transformational leadership factor.

Therefore, using this tool would give me greater flexibility at examining unique relationships with the five sub-dimensions apart from examining the total transformational leadership score.

Table 3.1
Empirical Evidence of the effectiveness of Transformational Leadership

Authors (Year)	Study	Sample/Methodology	Findings
Barling, Weber, and Kelloway (1996)	Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment	A pre-test–post test control-group design (N = 20 managers): Randomly assigned to 9 (training) and 11 (control). Training consisted of a 1-day group session and 4 individual booster sessions thereafter on a monthly basis/Interventional	Using pre-test scores as the covariate, multivariate analyses of covariance showed that the training resulted in significant effects on subordinates' perceptions of leaders' transformational leadership, subordinates' own organisational commitment, and aspects of branch-level financial performance.
Bass, Avolio, Jung, and Berson, (2003)	Predicting unit performance by assessing transformational and transactional leadership	N=72 light infantry rifle platoon leaders for ratings of unit potency, cohesion, and performance for US Army platoons participating in combat simulation exercises/Experimental	Both transformational and transactional contingent reward leadership ratings of platoon leaders and sergeants positively predicted unit performance. The link of leadership to performance was partially mediated through unit's level of potency and cohesion.
DeGroot, Kiker, and Cross (2000)	A **meta-analysis** to review organisational outcomes related to charismatic leadership	N=36 Studies/Meta-analysis of studies identified through published review of the literature in a variety of settings	Positive relationships between charismatic-transformational leadership and performance were found. Performance at the group level was double in effect size to those at individual level.
Lowe, Kroeck, and Sivasubramaniam (1996)	Effectiveness correlates of transformational and transactional leadership: A **meta-analytic review** of the multifactor leadership questionnaire literature	N=39 Studies/Meta-analysis of research studies in a variety of organisational settings	Transformational leadership significantly predicted work unit effectiveness across the set of studies examined.

Table 3.1...continued
Empirical Evidence of Transformational Leadership

Authors (Year)	Study	Sample/Methodology	Findings
Podsakoff, MacKenzie, and Bommer (1996)	Transformational leader behaviours and substitutes for leadership as determinants of employee satisfaction, commitment, trust, and organisational citizenship behaviours	N=1539 employees across a wide variety of different industries, organisational settings, and job levels/Cross-sectional survey	The study found a positive effect of transformational leadership on subordinate's trust in leadership.
MacKenzie, and Podsakoff (2001)	Transformational and transactional leadership and salesperson performance	N=477 Sales Agents in a large national insurance company/ Multi-method: Cross-sectional survey and objective data on performance	The study validates that transformational leadership influences salespeople to perform "above and beyond the call for duty". Furthermore, transformational leadership has stronger relationship with sales performance than transactional leadership.
Rafferty and Griffin (2004).	Dimensions of transformational leadership: Conceptual and empirical extensions:	N=1398 Australian Public Sector Organisation responsible for policies and programs related to government buildings, capital works, procurement development and administrative services/Cross-sectional survey	In this article, the authors proposed and found empirical support for five sub-dimensions of transformational leadership namely vision, inspirational communication, intellectual stimulation, supportive leadership and personal recognition.

3.3.6 Transformational Leadership and Teamwork

This thesis looks at both leadership and multiprofessional team climate as sources of social support. A study that links transformational leadership with team working is that by Arnold, Barling, and Kelloway (2001) utilizing the MLQ tool and aggregating data collected from a sample of 177 MBA executive students, nested in 42 teams, to team level. The results showed transformational leadership in teams as an effective way to encourage development of trust, commitment, and team efficacy. Furthermore, Özaralli (2003) examined the effectiveness of transformational leadership in promoting empowerment amongst employees and its consequent effect on team effectiveness. Based on a sample of 152 employees from eight Turkish companies, the results showed that transformational leadership contributed to the prediction of subordinates' self-reported empowerment, which in turn predicted team effectiveness.

Podsakoff, MacKenzie, Moorman, and Fetter (1990) found that followers' trust in their leaders mediated the effects of the transformational leader behaviours on citizenship behaviours. It is because of trust that team leadership (Zaccaro, Rittman, & Marks, 2001) predicts team effectiveness. Hackman (2002) argued that team leader effectiveness depends on how well a leader designs and supports a team so that members can manage themselves.

Research on transformational leadership and its link with team leadership and teamwork is still developing. Therefore, this research aims at contributing further to knowledge in this subject area. The next section deals with the conceptual link between transformational leadership and performance.

3.3.7 Transformational Leadership and Performance Management

Over the last decade, the focus of researchers in work and organisational psychology across contexts started to turn towards linking human resource and work practices with performance. The importance of good leadership is becoming increasingly apparent within health care (Firth-Cozens & Mowbray, 2001) with evidence of effects on the stress or wellbeing of their staff, and subsequently on quality of care. Health care organisations are keen to have evidence-based practices in their efforts to improve quality of care (Walburg et al., 2006). This involves effective leadership aimed at adopting a strategic approach that specifies the building blocks for outcome management. This thesis is proposing achieving performance through transformational leadership. It is intriguing to find out the mechanism of how transformational leadership may lead to better performance. Four separate studies tried throwing some light into this still largely unexplored area.

In research involving 72 US Army platoons participating in combat simulation exercises, Bass, Avolio, Jung, and Berson (2003) found that transformational and transactional (contingent reward) leadership ratings of platoon leaders and sergeants positively predicted unit performance. The units' level of potency and cohesion partially mediated the relationship between platoon leadership to performance.

MacKenzie and Podsakoff (2001) examined the impact of transformational and transactional leader behaviours on salespersons' performance and organisational citizenship behaviours, as well as the mediating role played by trust and role ambiguity. The findings validated the premise that transformational leadership influenced salespersons to perform "above and beyond the call of duty". After controlling for common method biases, the study also showed that transformational leader behaviours exhibited stronger direct and indirect relationships with sales performance and organisational citizenship behaviour than transactional leader behaviours.

In a study involving 32 Taiwanese companies in the electronics/telecommunications industry, Dong I. Jung, Chow, and Wu (2003) found that transformational leadership had significant and positive relations with both empowerment and innovation-supporting organisational climates. At the same time, they found that empowerment showed a significant but negative relation, while innovation-supporting organizational climate had a significant and positive relationship with organizational innovation.

In another study involving sales representatives of a global pharmaceutical firm located in Australia, McColl-Kennedy and Anderson (2002) found that the effect of transformational leadership style on performance was significant, but indirect. These authors found that transformational leadership had a significant direct influence on experienced frustration and optimism, with the negative influence of frustration having a stronger effect on performance than the positive influence of optimism. Frustration and optimism showed a direct influence on performance, whereas the emotions, frustration and optimism, fully mediated the relationship between transformational leadership and performance.

Finally, in a field study of 209 leader-follower dyads from 12 different organisations Whittington, Goodwin, and Murray (2004) found that transformational leadership and job enrichment each had significant main effects on three follower outcomes namely, performance, affective organisational commitment, and organisational citizenship behaviour. The findings also showed that job enrichment substituted for the effects of transformational leadership on affective commitment, whereas goal setting enhanced relationships between transformational leadership and both affective commitment and performance.

To my knowledge, there is no available literature on the relationship between transformational leadership and performance in hospitals. Hence, it is my intention to throw light on this crucial relationship through this research. In conclusion, several constructs may mediate the relationship between transformational leadership and performance, which I intend to explore through the buffering hypothesis of the stressor-to-strain link.

3.4 Teamwork

Teamwork is one of the most popular and recommended tools for optimal organisational performance. The belief that teamwork is the most effective way of delivering products and services within diverse organisational settings is gaining predominance. It is the team rather than the individual that is the basic building block of organisations, whose *modus operandi* is team-based (West, 1996). Indeed, the emergence of teamwork has intensified during the last decade as a major management concept to enhance performance and gain competitive advantage (Katzenbach, 1998). Teambuilding provides the strength and structure to deal with work complexities, changes, and pressures.

Although as a concept it is popular in the business world and in sports, major exponents in the health sector are recommending that adopting the team approach is the only way forward in health care (English, 1997; George, 1999). In contrast to sports teams, health care teams are not in competition with each other. However, it is clearly specified that teamwork is not about everyone trying to do the same job and that teamwork can be difficult, but worth pursuing. Specifically in the occupational stress literature, some studies referred more to groups rather than teams. For example, Bliese and colleagues used the variables group leadership, group cohesion, group collective efficacy, and group work demands (Bliese & Jex, 2002).

Indeed, the results from research with hospital-based health teams (Borrill et al., 2001; Carter & West, 1999), showed that those working in *real* (Hackman, 2002) and therefore in well-functioning teams had much lower levels of stress than those working in *pseudo teams* (looser groupings) or those working individually. All these positive findings appeared to buffer employees from the stress, clearly prevalent within the NHS (Firth-Cozens, 2003). The results also showed that team membership buffered individuals from negative climate effects and conflict in NHS hospitals.

Several authors argued that all teams are groups but not all groups are teams (Belbin, 1981; Cartwright, 2002; Katzenbach & Smith, 1993; Staniforth, 1996). Several questions spring to mind: What are teams? Why should we have teamwork in health care? Is it teamwork for its own sake? To what extent do we need teamwork in modern health care delivery and what is the evidence? How could health care teams be organised into well-functioning teams? This chapter will attempt to answer these questions against a background of evidence-based practices in health care.

3.4.1 Definition of Teams

Emile Durkheim, considered as the father of group work and research, contends that society bases itself on fundamental solidarity among people, derived from interpersonal relationships. The literature on teams and team working has evolved from that on groups, group working, and group dynamics and it provides several definitions. The use of the word *team*, as applied to work groups, was not widely used until the 1970's, and it only became a catchword in the 1990's.

The New Shorter Oxford English Dictionary (1993) defines a team as a set of people working together. Team spirit is the willingness to act for communal good. A team is something quite different from a group of individuals working in the context of a team. A team is a group of people with interdependent functions and complimentary skills, brought together to work towards a common purpose (Katzenbach & Smith, 1993). In reviewing the literature, there appears to be agreement on the definition of teams. For the purpose of the research, I will use the definition of a team by Mohrman, Cohen, and Mohrman (1995, p.39),

> *"A team is a group of individuals who work together to produce products or deliver services for which they are mutually accountable. Team members share goals and are mutually held accountable for meeting them, they are interdependent in their accomplishment, and they affect the results through their interactions with one another. Because the team is held collectively accountable, the work of integrating with one another is included among the responsibilities of each member"*

Teams are effective work groups, whose effectiveness rests on the degree of motivation, co-ordination, and purpose (Manz & Neck, 1995). The synergy produces energy, creativity, and innovation, which is beyond individual achievement (Borrill et al., 2001). Working as a team member, therefore, implies agreement on a common focus and clarity on roles, responsibilities, accountability, and communication.

Specific to health care, building and maintaining health care teams may be the key to tackling fragmentation and providing patients with a complete package of care (Salas, Sims, Klein, & Burke, 2003). In health care, as in other contexts, the task defines the team. These tasks need to be team tasks that tackle multi-faceted objectives through an appropriate mix of skills and knowledge. Such an operation requires interdependency between members for successful completion.

3.4.2 Team Tasks

For teams to be successful, they must embark on team tasks (West, 1994). Solid examples of team tasks include geriatric care and rehabilitation (Hughes & Medina-Walpole, 2000; Sommers, Marton, Barbaccia, & Randolph, 2000). The multi-dimensional nature of health care needs of older people, or the complexity involved in rehabilitation from trauma, physical or mental illness, offer multiple challenges such that the need for teamwork is inescapable. In these situations, by adopting a holistic approach in the management of the patient, one ensures better quality of care and satisfactory outcomes.

Both geriatrics and rehabilitation offer fertile ground for the curious and imaginative health care professionals, confident of unravelling the puzzle of multiple diagnoses. However, the professional mind needs to mature to the state of understanding the interrelated influences of health, economic, and social dynamics, or the consequences of disturbances in one or more areas of total functioning. Otherwise, the seemingly obvious care plan may fail to achieve the desired outcome, namely good health and independent living.

Solo attempts by medical doctors or indeed other health care professionals to manage these situations have become less feasible (Salas, Sims, Klein, & Burke, 2003). On a similar note, they are the particular needs of the patient that determine the types, context, and structure of health care teams. For example, although the most commonly required health care workers in the geriatric team are the dentist, dietician, GP, nurse, occupational therapist, pharmacist, physiotherapist, podiatrist, social worker, and speech therapist, each patient presents with specific needs.

In reality, attaining all these criteria in health care teams may not be easy. For example, there is a difference between a cardiac surgical team and a team in a general medical ward (Edmondson, 2003; Gorman, 1998). The cardiac surgical team is usually composed of less than fifteen members, who have well-defined roles and who are working constantly together for long periods throughout heart surgery. The team has a well-defined boundary with little/no contact with other people. Having to satisfy strict time constraints while the patient is on the operating table, as well as attaining a result of frequent practice, communication, and activities becomes increasingly instantaneous. In short, the cardiac surgical team is task-focused and satisfies all the criteria for team effectiveness.

In a general medical ward, there are usually more than fifteen members in teams, which are less well defined with some overlap between roles particularly in dealing with health and social issues. Borrill et al. (2001) showed that team working is not uniformly present in health care. Indeed, this group of researchers had distinguished between a well-functioning (real) team, a pseudoteam, which does not satisfy all the criteria of real teams, and no team.

3.4.3 The Organisation of Health Care Teams into Well-Functioning Teams

There are several characteristics of a well-functioning team (West & Slater, 1996), namely collective responsibility for achieving shared aims and objectives, interaction between team members to achieve these objectives, team members' defined roles, and a team identity. To have a clear identity, the team must have a clear boundary to distinguish itself from a working group.

Therefore, membership implies that members are expected by their colleagues to follow team norms and obligations with, however, reciprocal expectations by team members of gaining membership rights and participation in the team. The latter is particularly true for junior members of the professions, who have to assert themselves to earn their membership status. Furthermore, size is a determinant factor, so much so that team sizes greater than fifteen become less effective (Borrill et al., 2000).

3.4.4 Dominant Theories in the Research on Teams

Teamwork is a multi-dimensional concept (Ingram & Desombre, 1999). Four theories related to team development, effectiveness and performance appear to be dominant in the research on teamwork. A clear understanding of these facets of team working is essential to sustain the relationship between teamwork and social support.

3.4.4.1 The Stages of Small Group Development

The first theory describes the stages of small group development (Tuckman, 1965; Tuckman & Jensen, 1977) namely: *forming* – testing and dependence; *storming* – intragroup conflict; *norming* – development of group cohesion; *performing* – functional role accomplishment and *adjourning* – termination and separation. A team develops its own culture and hierarchy through a series of stages (Scholtes et al., 1996). If these stages are not reached, the group is unlikely to coalesce into a team.

Drinka and Clark (2000) redefined the final stage as *leaving* rather than *adjourning*, as health care teams, rather than dissolving completely, show a change in composition. This theory suggests that the degree of social support varies throughout the stages and this explains the varying degrees of social support found in various types of groups and teams. Therefore, the stage of team formation may be a confounding variable in determining the degree of social support as provided by leaders and colleagues.

3.4.4.2 The Context of the Team within an Organisation

The second theory (Figure 3.2) identifies the context of the team within an organisation (Scholtes et al., 1996) and advocates the alignment of individuals, teams, and organisation. The support of the organisation is crucial for effective team working (McClane, 1992).

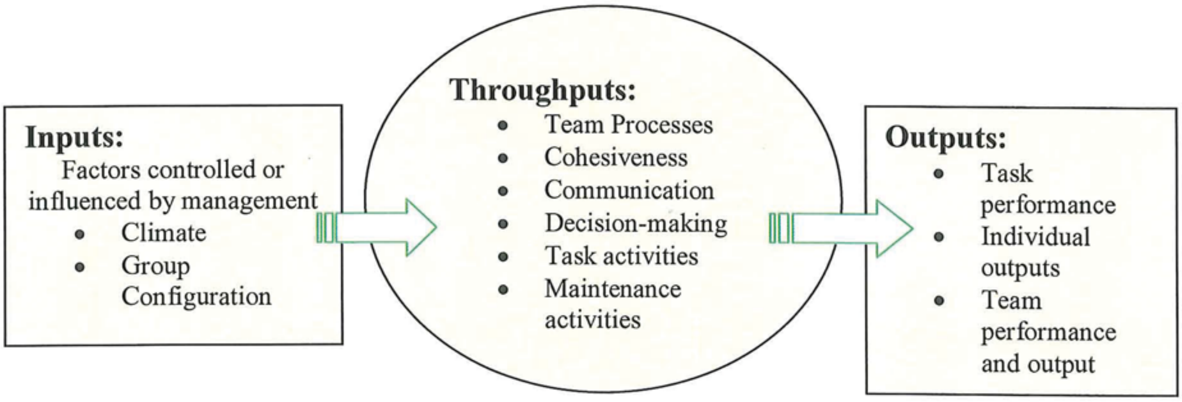
Figure 3.2: Team Development Model (Scholtes et al., 1996)

		DIMENSIONS		
		Organisation	**Team**	**Individual Member**
PRIMARY TASKS	**Purpose (why, what)**	Mission	Goals	Roles and Responsibilities
	Partnership (with whom)	Values and Beliefs	Norms and Communication Channels	Interpersonal Skills
	Process (How)	Management Systems and Reviews	Methods and Procedures	Problem Solving and Planning Skills

3.4.4.3 A Systems Approach in Building a Model of Effective Teams

Mullins (1992) described a team as an open system that interacts with its environment in the process of transforming inputs to outputs. Figure 3.3 shows how Ingram et al. (1997) proposed a descriptive systems model of the key characteristics of effective teamwork featuring inputs, throughputs, and outputs. In the systems model, the inputs provide support both from the organisation as well as from the group structure. Furthermore, the throughputs define processes such as cohesiveness, communication, and maintenance activities that are crucial if social support needs to be forthcoming.

Figure 3.3: A Systems Model of Effective Teamwork - Adapted from Ingram et al. (1997)



West, Borrill, and Unsworth (1998) developed a similar input–process–output model (Figure 3.4) that is more adapted to health care. The well-validated *Team Climate Inventory* developed by Anderson and West (1998) is based on the model in Figure 3.4 (overleaf) and focuses on four components of team climate namely clarity of objectives, participation, team task orientation, and support for innovation.

This model recognises leadership as a process that reaffirms the link between the two areas of organisational behaviour. The model also includes support for innovation, which is identified as a critical element of transformational leadership, effective team working (Borrill et al., 2001; West et al., 2003), and social support. Furthermore, and in line with the earlier discussion on teams, the model recognises the critical elements of organisational context and structure, as well as team context and structure as essential inputs in the systems model. Additionally, apart from the four dimensions of team climate, the model includes reflexivity, decision-making, and communication/integration as group processes, all of which are critical elements in providing the supportive climate for greater empowerment in decision-making.

Figure 3.4: Input, Process, Output Model of Team Effectiveness (West et al., 1998)

INPUTS	GROUP PROCESSES	OUTPUTS
• Domain • Health Care Environment • Organisational context • Team task • Team composition	• Leadership • Clarity of objectives • Participation • Task orientation • Support for innovation • Reflexivity • Decision making • Communication/ Integration	• Effectiveness - self and externally rated • Clinical outcomes/quality of health care • Innovation - self and externally rated • Cost effectiveness • Team member mental health • Team member turnover

The model by West et al. (1998) includes several variables as output measures of team effectiveness. The first is self- or externally- rated effectiveness. The advantage of using external ratings rather than self-measures, as indeed I have done in the second study, is to avoid collecting data on the explanatory and criterion variables from the same source, thereby overcoming common source bias.

3.4.5 Need for Teamwork in Health Care

Gorman (1998) pointed towards practical and psychological reasons of why health care professionals should work in teams, namely that staff enjoy working in teams, and have their contributions and individuality acknowledged for the greater good of patient care. He provided several scenarios of how both unidisciplinary and multidisciplinary teams in the British National Health Service (NHS) might function.

More prominently, George (1999) described team working as an essential prerequisite to modern clinical care. In his report *'Team working in medicine'*, he outlined the qualities, roles and responsibilities of effective medical and clinical teams, and emphasised the need for team members to adopt a positive attitude towards patients, to be aware of patients' wishes and needs, and to make sure of a clear understanding by patients and colleagues on their roles, responsibilities, professional status and specialty. It is worth noting that health care has experienced a paradigm shift from unidisciplinary to multidisciplinary care (Gorman, 1998). The basis of multidisciplinary care lies on the concept that members of the team come from different disciplines, with separate training and education. As a result, they bring different skills for the patient's benefit. Therefore, team members often work side-by-side in a sequential manner.

Moreover, the literature describes a subtle shift in emphasis from multidisciplinary towards interdisciplinary care (Drinka & Clark, 2000; Fulmer & Hyer, 2000) brought about by the proliferation of medical specialties, the improved academic background of nurses and allied health care professionals, and advances in technology. Interdisciplinary teams go a step further in that interdisciplinary collaboration and interdependency bring the different professions to work together. The new challenge is to provide a coordinated, comprehensive, and holistic approach to care.

Yukl (2002) identified five types of teams, namely functional operating, cross-functional, self-managed, self-defining, and top executive teams. The author described cross-functional teams, which in this research refer to multiprofessional teams, as showing a low-to-moderate autonomy to determine mission and objectives; a high autonomy to determine work procedures; a high authority of the internal leader; low to moderate duration of existence; low to moderate stability of membership; and high diversity in professional background.

With regard to leadership, Proehl (1996) emphasised the need for strong leadership in cross-functional teams. Indeed, both Proehl (1996) and Weber (2002) concluded that standard team development practices are not enough to ensure the success of cross-functional teams. Weber (2002) added that the major task of the leader in cross-functional teams is to develop a team climate of trust. Multidisciplinary team leadership provides the possibility of *shared* leadership, which results in better team innovation (Borrill et al., 2000). Working together rather than alongside each other motivates the different professions to be innovative and gives them the impetus to replace dated and deep-rooted procedures with new methods (Nolan, 1995). Unfortunately, traditional professional hierarchies and boundaries remain significant barriers to successful interdisciplinary practice in some health care organisations. Multiprofessional team working has proved difficult to achieve in practice because of interprofessional barriers such as those existing between doctors and nurses (Borrill et al., 2001).

3.4.6 Conceptual Link with Social Support and Decision Latitude/Control

Team elements such as team identity, collective responsibility, interaction, interdependence, mutual accountability, and synergy strongly suggest the provision of all four types of support, that is instrumental, emotional, informational and appraisal support. Furthermore, the *Team Climate Inventory* (Anderson & West, 1998) focuses specifically on the dimension *support for new ideas*, which by itself provides an incentive to participants on all the facets of House's support to foster new ideas and encourages team members to come forward with them. Of relevance in this context, Borrill et al. (2001) found that those working in well-functioning hospital based teams report higher levels of social support. Team members are able to provide each other with appraisal, instrumental, emotional, and informational support that "enables employees to be buffered from the stress that many feel within the NHS" (p. 4).

With regard to the conceptual link of teamwork with decision latitude/control, the elements within the team definition, namely clarity of objectives, common purpose and role clarity, are critical in the decision-making process, to achieve the right decisions at the right time, and place, and with the right person. Furthermore, the elements of synergy, mutual accountability, and interdependence call for more shared decision-making. Both clarity of and sharing in decision-making are conceptually critical elements in allowing individuals within groups to be empowered in decision-making. As long as there is a strategic fit between the team's vision and its organisation, the team identity prompts members to take control of their decision-making in order to enable them to achieve the desired team performance and effectiveness.

In the health care multiprofessional environment, one may expect interprofessional variations in decision control, which traditionally has been higher for the medical than for other professions. However, the concept of team working in health care has increasingly shifted from decision-making taken by one person to shared decision-making (Drinka & Clark, 2000).

The elements in the team definition adopted in the literature (Table 3.2) provide all four types of support as defined by House (1981).

Table 3.2
The Elements in the Team Definition and Conceptual Links with Social Support and Decision Latitude/Control

Team definition	Conceptual Link with Social Support and Decision Latitude/Control	References
Clarity of objectives	Informational support Clarity during decision-making process	Borrill et al. (2001); Katzenbach & Smith (1993); West et al. (2003)
Collective responsibility	Instrumental and emotional support Shared decision-making	Adair (1988); Hackman (1990, 2002); Katzenbach & Smith (1993); West & Slater (1996)
Common purpose	Informational support Clarity during decision-making process Shared decision-making	Adair (1988); Borrill et al. (2001); Heinemann & Zeiss (2002); Katzenbach & Smith, (1993); Ingram & Desombre (1999); Stott & Walker (1995); West & Slater (1996)
Interaction	Appraisal, instrumental, emotional and informational support Shared decision-making	Mohrman, Cohen, & Mohrman (1995); West & Slater (1996)
Interdependence	Appraisal, instrumental, emotional and informational support Shared decision-making	Belbin (1993); Hackman (1990, 2002); Mohrman, Cohen, & Mohrman (1995); Ray & Bronstein (1995); Schein (1988); Stott & Walker (1995)
Mutually accountable	Instrumental and emotional support Clarity during decision-making process Shared decision-making	Borrill et al. (2001); Katzenbach & Smith (1993); Mohrman, Cohen, & Mohrman (1995)
Role clarity	Informational support Clarity during decision-making process Shared decision-making	Belbin (1993); Borrill et al. (2001); Heinemann & Zeiss (2002); Katzenbach & Smith (1993); Margerison & McCann (1985, 2000); Ray & Bronstein (1995); West & Slater (1996)
Synergistic outcomes	Informational and appraisal support Clarity during decision-making process Shared decision-making	Adair (1988); Firth-Cozens (1998); Ingram & Desombre (1999); Manz & Sims (1987); Staniforth (1996)
Team identity	Emotional, instrumental and appraisal support Clarity during decision-making process Shared decision-making	Hackman (2002); West & Slater (1996)

Happell et al. (2003) found that forensic nurses reported lower levels of burnout and higher levels of job satisfaction than their counterparts did from the general services. They attributed this finding to the greater involvement in decision-making by their supervisors and better co-worker support among forensic nurses. The literature identifies poor social support from colleagues and supervisors (Ross, Altmaier, & Russell, 1989) apart from workload and inadequate staffing levels (Muncer, Taylor, Green, & McManus, 2001) as contributing factors resulting in work-related stress and anxiety. Karasek's DC/S (1979, 1990) model explains these findings through the interaction of environmental demands and individual control of decision-making/skill use to predict a range of health and behavioural outcomes.

Guzzo, Salas, and Associates (1995) argued that decision-making in teams is distinct from individual decision-making, in that team decision-making necessitates the integration of unequally distributed information among members. These authors however acknowledged that uncertainty and status differences among members, as indeed may be the case with multiprofessional health care teams, often disrupt the integration process.

3.4.7 Team Effectiveness versus Team Performance and the Conceptual Link with Unit Performance

Brodbeck (1996) argued against the use of the often-interchangeable terms of performance and effectiveness. Specifically in the context of work group functioning, the author distinguished performance based on process criteria from effectiveness based on outcome criteria. Performance is "an aggregate of those behaviours that are relevant for achieving the goals specified" whereas effectiveness is "the degree to which the performance outcomes approach the goals specified" (p. 287). Moreover, West, Markiewicz and Dawson (2004) referred to performance as an umbrella term that includes team effectiveness as an output in the input-process-output model of team performance.

There are benefits of team working from the organisational, health care staff, and patient perspectives. The benefits of teamwork from the organisational and patient perspectives have been emphasised in numerous reports and policy documents on the NHS.

One NHS Management Executive Report (1993) particularly stated that health care is more cost-effective, when professionals work and learn together, as well as engage in clinical audit of outcomes together. The same report associated teamwork with innovation in ensuring progress in practice and service delivery.

There is evidence that teams reduce hospitalisation time and cost (Ingram & Desombre, 1999) and improve the quality of service (Salas, Sims, Klein, & Burke, 2003). Furthermore, effective team working in primary health care is associated with lower hospital admission rates, better service provision (Indredavik et al. 1999), fewer operations, and reduced physician visits, resulting in significant cost savings (Eggert et al., 1991; Sommers et al., 2000).

Other studies reported that well-functioning primary health care teams enjoyed better detection, treatment, follow-up, and outcome in hypertension (Adorian et al., 1990). By eliminating duplication and streamlining patient care, they also enabled cost-effective utilisation of specialist care. Furthermore, patients who had access to a primary health care team expressed higher levels of satisfaction than those who had access only to a physician.

The strongest evidence ever presented in favour of effective teamwork was the significant and negative relationship between the percentage of staff working in teams and the mortality in these hospitals This evidence takes into account both local health needs and hospital size (West et al., 2002). Indeed, there is nothing as definite as mortality statistics. Where more employees worked in teams, the mortality rate was significantly lower.

Various health service organisations understand that the whole rather than the sum of the creativity and commitment of the health care professionals contribute towards improved quality of patient care.

From the health care employees' perspective, a well-functioning team with clear team and individual goals that meets together often, and that values the diverse skills of its members, increases performance and team innovation (West and Anderson 1996) and also reduces stress levels (Sonnentag, 1996). Firth-Cozens (1993) claimed that stress levels of clinical staff could severely affect the quality of patient care. Developing a team-based structure is becoming an important way of securing greater participation and motivation as well as a means of sharing stress, success, and failure. Knowledge is so complex and specialised that virtually no single individual can be effective alone (Sorrells-Jones & Weaver, 1999).

The results from the previously mentioned research conducted on British NHS teams (Borrill et al., 2001) showed that members of well-functioning teams were more motivated (Piero et al., 1992), and experienced better co-operation, better communication, and detailed negotiation of effective work roles. These team members reported more positive work attitudes and a higher level of social support from leaders and co-workers. They reported supporting each other both practically and emotionally during times of difficulty or stress.

A frequently occurring problem in health services is shortage of well-trained health care professionals (Hamilton, Redshaw, & Tarnow-Mordi, 2007). Health care organisations are becoming increasingly aware of the importance of safeguarding the physical and psychological well-being of health professionals primarily to ensure patient safety but also to avoid high turnover of staff (Borrill et al., 2001).

Indeed, NHS studies showed that nurses working in well-functioning teams were less likely to leave their organisations or professions over the one-year period of monitoring retention and turnover rates than those working in poorly functioning teams. Further evidence showed that within health care, those working in well functioning teams are more likely to stay working in their settings than those working in poorly functioning teams (Borrill et al., 2001).

3.4.8 The Relationship between Team Climate and Quality of Care, as part of Measured Performance in Health Care

The best way to assess the issue of quality is to look at health care through the patients' eyes. Health care has become increasingly complex, often with a presentation of multiple pathologies and social issues. In developed countries, this is mostly due to an ageing population as well as changing family structures. The response of health and social services has been the creation of new systems of care and a paradigm shift in the philosophy of patient management.

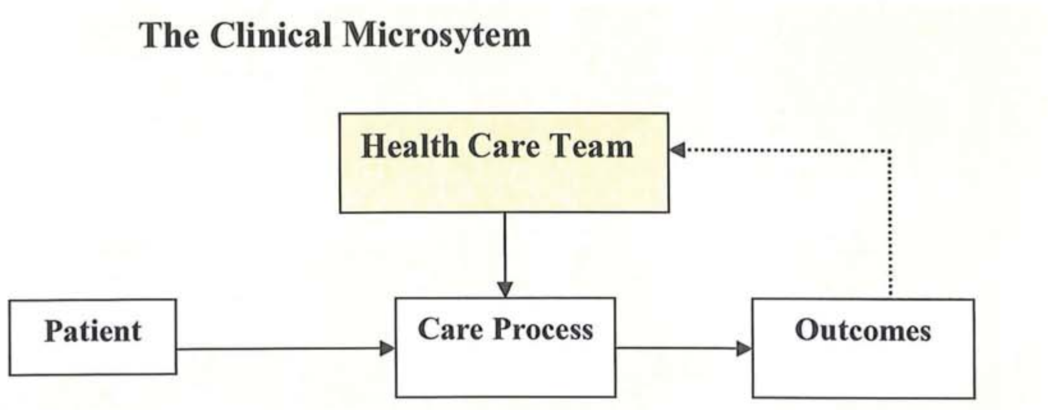
Two issues that are gaining prominence in health care are the promotion of a wellness rather than an illness approach, and the adoption of a combined medical and social model in reaching a complete diagnosis. This has led to health care increasingly adopting a holistic approach such that plans follow guidelines, protocols, and critical pathways. Additionally, health care organisations, which are also becoming more complex and technological, are obliged to follow the system of *Clinical Governance*, in which they are held accountable to continuously improve the quality of their services, to benchmark care with the highest standards, and to push for clinical excellence.

"*Quality in health services*" is defined as "fully meeting requirements at the lowest cost" or, more specifically, "fully meeting the needs of those who need the service most, at the lowest cost to the organisation, within limits and directives set by higher authorities and purchasers" (Ovretveit, 1992, p.2). To meet the needs of patients fully, quality of care and teamwork are inseparable. The three dimensions of health service quality as defined by Ovretveit (1992) are client quality (what clients and carers want from the service), professional quality (whether the service meets needs as defined by the health care professionals), and management quality (the most efficient and productive use of resources).

In the 1980's, Donabedian made a clear distinction between three attributes of health care namely *input* that refers to the human, financial, technological and structural resources required to provide care, *process* that refers to the degree of compliance by health professionals with guidelines, and *outcomes* that refer to the changes in patient' health profile after treatment. Des Harnais and McLaughlin (1994) defined quality of health care, given the present state of medical knowledge (input) and referred to the degree to which delivery of care (process) increases the likelihood of achieving the desired patients' expectations without undesirable effects (outcomes). Indeed, quality of care is firmly part of performance management in the health service, with sufficient evidence that quality of teamwork, by high-performing teams, is positively associated with quality of patient care (West, 2002).

Over the years, health organisations have shown commitment at establishing outcome-based measures, thereby providing the necessary groundwork for the application of benchmarks. Quality is therefore a dynamic process that relies on benchmarking with continuously up-dated list of best practices. Walburg et al. (2006) went a step further in specifically defining four elements of outcome management in health care, which are the patient, the *care team*, the care process, and the outcomes that together form a *clinical microsystem* (Figure 3.5).

Figure 3.5: The Clinical Microsystem (Walburg et al., 2006)



The team of health care professionals features prominently in the feedback cycle, as the patient needing treatment or care for a particular condition/s enters the pathway. The improvement or otherwise in the patient's health is monitored through outcomes that should be continuously fed back to the care team. The responsibilities of the health care team lie in the implementation and continuous improvement of the care process, hence their crucial positioning in the microsystem, where they need to receive up-to-date results of outcome measures.

3.4.9 Team Leadership

There is evidence, from the research carried out on the UK NHS primary health care teams, that lack of clear leadership is associated with lower levels of patient care and innovation (West et al., 2003). Additionally, lack or ineffective leadership is associated with all the elements that are necessary for team performance namely, lower levels of participation, lack of clarity about objectives, low commitment to quality of care and low support for innovation in quality of care. The research by the Aston Group highlights a definite association between lack of clear leadership and high levels of stress amongst team members. Therefore, there is no doubt that teams without leaders, or indeed without effective leaders, are not well functioning.

An emerging notion, which appears to be a by-product of teamwork, is that rather than identifying a single clear leader, teams are increasingly reporting shared leadership. In fact, from the same research reported earlier, only a third of primary health care teams and only thirteen out of one hundred, and thirteen community mental health teams, reported having a single clear leader. In nearly half of primary health care teams, members reported that a number of people led the team.

West et al. (2003) claimed that clarity of leadership involves setting the right strategies and conditions for team members to align themselves around shared objectives. Indeed, amongst the leadership theories, transformational leadership fits in very well with the team concept. The characteristics of transformational leadership, namely exercising of clear vision, inspirational communication, intellectual stimulation, supportive leadership and personal recognition (Rafferty & Griffin, 2004) will help the team leader/s in achieving the team's strategies.

The team leader has the role of creating a sense of optimism and confidence among the members (Hackman, 2002; Kogler Hll, 2001). By creating a calm, inspiring, and exciting environment, the leader helps members appreciate each other's contribution and helps them through collective learning, how to confront, and resolve differences constructively (Berry, 2003). This is more possible if the leader encourages flexibility and offers objective analysis of processes. Furthermore, the leader must maintain high standards by co-ordinating activities, and by inspiring members to improve their capabilities through continuing professional development.

Finally, yet very importantly, an organisation that recognises clarity in its leadership demonstrates stronger team identity. The leader will be in a better position to represent the interests of the team, and protect its reputation. Furthermore, the team, through an effective leader, will be able to establish trust with external stakeholders and to resolve conflicts with other teams (Hackman, 2002). Most health care professionals do not acquire leadership, management, and team working skills during their formative years (Drinka & Clark, 2000). The learning culture in most academic institutions is towards clinical teaching, with non-clinical competencies given inadequate focus (English, 1997).

Indeed, the UK NHS research has shown that there is little evidence of such clear and effective leadership in health care teams (Borrill & West, 2000) so much so that a real need exists for formal training in non-clinical competencies. These include training in leadership, management, and teamwork to enable health care professionals, who are involved in leading or participating in teams, to work smarter rather than harder (Festa, 2005; Olsen & Neale, 2005).

The subject of who should be the team leader has often raised serious debates within health care organisations and professional associations, more so with the development of interdisciplinary teams (Berry, 2003; Drinka & Clark, 2000; Salas et al., 2003). For unidisciplinary teams, the choice of the leader is often according to seniority or merit. However, experience shows that we cannot assume that the best leaders are those in positions that are more senior.

Indeed, well-functioning teams often have the leadership role exercised by different members according to need. This is more so in multidisciplinary teams, where professional diversity expands technical knowledge and expertise to an extent that the locus of decision-making has to shift according to need (Drinka & Clark, 2000; Nichols, DeFriese, & Malone, 2002).

A frequently asked question is *whose role carries the authority for team decision-making?* Traditionally, the medical profession assumed this authority by virtue of the academic and professional status (Theorell, 2000). This is still the case with several countries and health care organisations. However, the academic and professional growth of the other health care disciplines is openly challenging the leadership and authority role that was in the past unquestionably assumed by the medical doctor (Agius, 2001). Moreover, the team metaphor creates expectations of more equality in decision-making and sharing of responsibilities and accountability. If the team is patient-focused, the quality of decision-making, rather than who decides what, should ultimately determine success in patient care.

3.5 Multilevel Perspectives of Transformational Leadership and Team Climate

In organisational research, the study of leadership and group processes is inherently multilevel in nature, necessitating analysis and interpretation of multilevel data (Bliese, Halverson, & Schriesheim, 2002). Through multilevel methodology, multilevel techniques provide powerful means for quantifying, analyzing, and understanding group phenomena (Hox, 2002). The multilevel nature of studies presents researchers with conceptual, measurement, and methodological challenges. Indeed, in this thesis, study two provides a setting whereby hospital employees share transformational leadership and team climate. As a result, they are considered as contextual variables.

The literature provides several multilevel studies on leadership such as those which explore a multilevel perspective of work unit context and leader-member exchange (Cogliser & Schriesheim, 2000) and the moderating influence of leadership climate (Gavin & Hofmann, 2002). Specifically in transformational leadership, Rafferty and Griffin (2006) explored the theoretical and empirical distinction between developmental leadership and supportive leadership, both of which formed part of the single sub-dimension individualized consideration as conceptualised by Bass (1985). By using structural equation modelling and multilevel modelling, the authors demonstrated that both developmental leadership and supportive leadership displayed unique relationships with theoretically selected outcome measures. Indeed, developmental leadership displayed significantly stronger relationships with job satisfaction, career certainty, affective commitment to the organization, and role breadth self-efficacy than did supportive leadership.

Similarly, Sosik, Godshalk, and Yammarino (2004) examined the assumption that traditional mentor-protégé relationships, based on mutual learning and development orientations, operate at the dyadic level of analysis. By adopting a multilevel analysis (individual and dyad) of the relationships among learning goal orientation, the authors gathered data on transformational leadership and expectations of career success (career achievement, development, and balance) reported by 217 mentors and their protégés from 11 different industries. Results of within and between analysis (WABA) indicated that learning goal orientation/transformational leadership and transformational leadership/expected career balance relationships were based on differences between dyads. In contrast, learning goal orientation/expected career success and transformational leadership/expected career achievement relationships were based on differences between individuals. The results of the advanced multilevel analysis provide useful implications for research and practice on leadership and mentoring relationships that were not possible with traditional statistical analysis.

With regard to multilevel analysis of groups and teams, the literature provides several examples with a number of still debatable issues in a still largely developing area. Multilevel researchers often gather individual-level data to measure group-level constructs. George and James (1993) emphasised the need to properly treat levels-of-analysis issues from both a theoretical and a statistical perspective before conclusions can be drawn. Furthermore, Kirkma (2001) used data on empowerment levels, collected from 98 work teams, based on the aggregation of individual team member ratings, as well as on a team consensus approach utilized after aggregation. The author then compared the two methods of measuring team empowerment on their ability to predict manager ratings of team effectiveness. Findings demonstrated that the consensus method of measuring team empowerment explained significantly greater variance in team effectiveness than did the aggregation method alone.

Klein, Conn, Smith, and Sorra (2001) found that group member social interaction and work interdependence were significantly positively related to within-group agreement regarding perceptions of the work environment. The authors referred to issues arising from multilevel research on groups, such as survey wording, which showed a complex relationship to agreement. For example, the use of a group rather than individual referent increased within-group agreement in response to descriptive items but decreased within-group agreement in response to evaluative items. Items with a group referent showed greater between-group variability than items with an individual referent.

Multilevel research in the health care context is still in its infancy even though health outcomes research studies are frequently multilevel in nature. Very often, the focus is on individuals nested within organizational contexts, for example patients or professionals nested in nursing unit, clinic, or hospital (Lake, 2006). Indeed, this research aims to provide more experience in multilevel research not only as part of organisational studies but also within the health care research domain.

3.6 Conclusion

In the previous sections, I critically reviewed the literature on leadership, with specific emphasis on transformational leadership, and on team climate. I have shown through the theoretical and empirical literature that both leadership and team working are organisational processes that determine social support and influence decision latitude/control.

The study by West et al. (2003) showed that clarity in leadership process resulted in clarity of team objectives, high levels of participation, commitment to excellence, and support for innovation, these being the four-team processes that determine team climate. Furthermore, studies by Borrill et al. (2001) confirmed that leadership, information sharing, shared influence over decision-making, participation, communication, and integration are necessary processes in the systems model of team effectiveness as illustrated by West et al. (1998). Additionally, Arnold, Barling, and Kelloway (2001) linked transformational leadership with development of trust, commitment, and team efficacy. This chapter also provided an insight on the multilevel perspective in the study of leadership and group phenomena, with some useful debated issues that I considered in the analysis of study two.

Therefore, in conclusion, the literature review chapters provided a solid and robust background to the hypothesised relationships in both study one and study two. The next chapter will present study one in this thesis.

CHAPTER FOUR
STUDY ONE

4.1 Introduction

Study one is the first attempt at investigating the moderator hypothesis of the stressor-strain relationship, and it provides unique theoretical and analytical perspectives. It is a multi-group study, based on the definition of team structure, but conducted on the individual-level of analysis.

Study one involves an investigation of a national random sample of health care employees working in acute hospital practice in the UK. Specifically, the sample under study comprises 65,142 respondents from 172 acute/specialist NHS trusts.

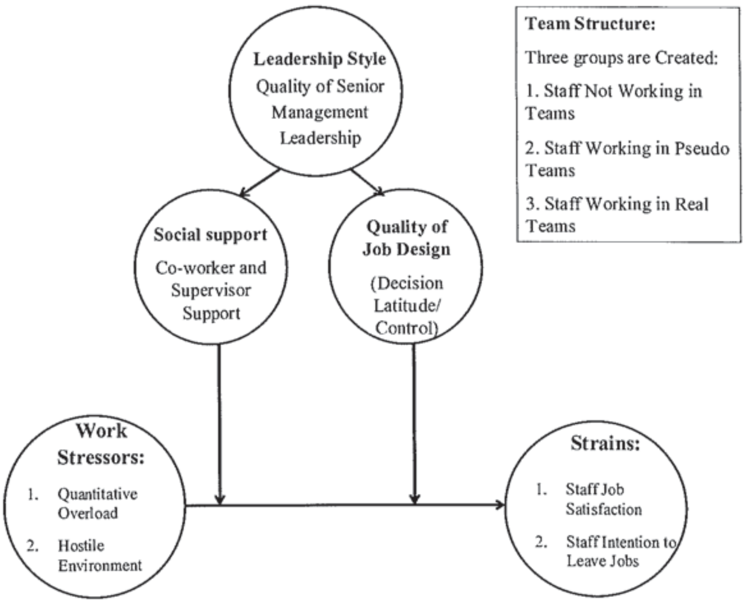
This study aims at investigating the proposition that quality of senior management leadership predicts social support and job design, and that specific work stressors lead to strains. Furthermore, the study aims at investigating whether social support and job design moderate the work stressor-to-strain relationships across three levels of team structure. The three levels include those that do not work in teams, those that claim they work in teams but do not fulfil the criteria of real teams, and those that work in real teams.

4.2 Theoretical Framework of Study One

A literature-based integrated model (Figure 4.1) is developed, based on the Job Demand-Control (DC) model developed by Karasek (1979) and later expanded into the three dimensional demand-control-support (DC/S) model by Johnson and Hall (1988). The theory is explained in detail in chapter two. The model in study one proposes that social support and job design moderate specific work stressor-to-strain relationships.

Additionally, it is proposed that the quality of senior management leadership predicts the level of social support and decision latitude/control as part of job design.

Figure 4.1: Illustration of Hypothesised Relationships between Variables of Interest



The theoretical framework in this study draws on several major theoretical and empirical bases. Starting with leadership, several authors linked support from management and leadership as major principles underlying quality in health care (Berwick et al., 1990; Arndt & Bigelow, 1998).

The responsibility that falls under senior management leadership has been greatly acknowledged during the introduction of total quality management and continuous quality improvement as mainstays defining delivery of health care. In a qualitative study on eight hospitals in the US, Bradley et al. (2003) identified management's personal engagement, relationships with clinical staff, as well as promotion and support of quality improvement efforts, as key roles of senior management in securing organizational success. James and colleagues (1989, 1990) refer specifically to organizational climate, characterised by four dimensions, as a requisite to organizational well-being. These are leader facilitation and support, job design and autonomy, work group co-operation, and finally, role stress and lack of harmony, which includes lack of management concern and awareness.

The second major area of theory and research in study one is firmly based on the Job Demand-Control-Support Model (J-DC/S), and it highlights the buffering hypotheses of stressor-strain relationships. As discussed in chapter two, Karasek (1979) contended that the primary source of work stress lies in the organisational context and structure of work rather than on the personal attributes or demographics. Furthermore, the DC/S-model predicts that jobs characterised by high demands, low control, and low support run a greater risk of developing strain, characterised by psychological or physical disorders. Quality of health care delivery therefore depends tremendously on the strength and well-being of the human resource. Dollard et al. (2000) specifically referred to human and economic costs as unwanted outcomes of work stress. Therefore, it is not surprising that stress researchers have over the years tried to provide more evidence in the area.

The third major area of theory and research in study one is teamwork and team structure. Research in this area has been particularly forthcoming by the Aston group of researchers (West and colleagues, 2001; 2002; 2003) whereby well-structured teams, labelled as *real* teams have been associated with better quality of health care delivery, lower patient mortality, and better staff well-being. Against this background, the research questions outlined in the next section are proposed.

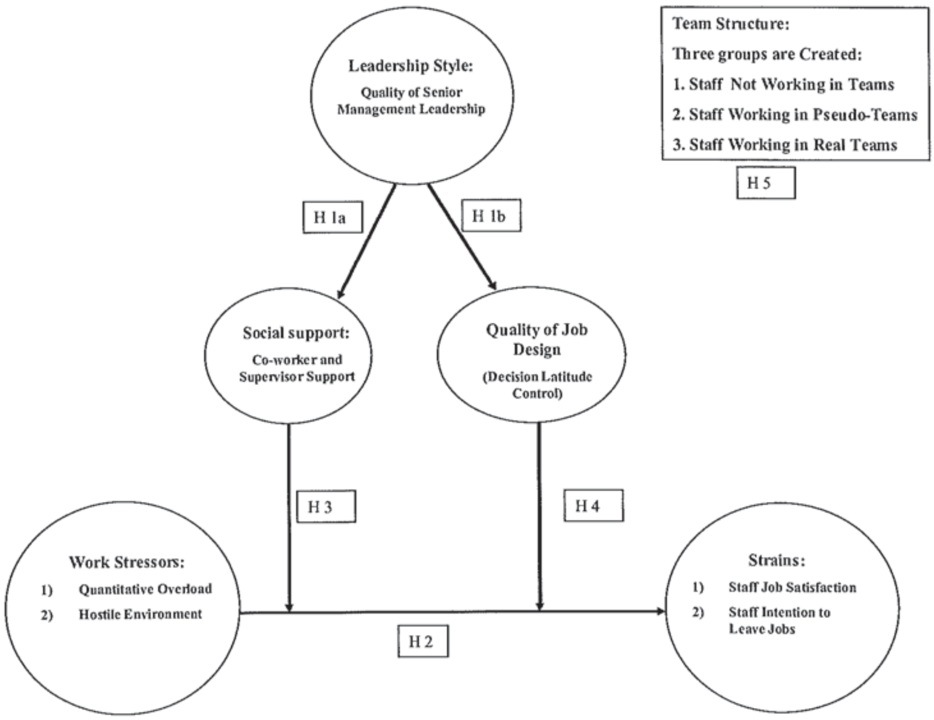
4.3 Research Questions

In this context, I have chosen to attempt to answer the following research questions:

1. *Are social support and quality of job design influenced by the quality of senior management leadership in hospital practice?*
2. *Are work stressors namely quantitative overload and hostile environment associated with strain?*
3. *To what extent do social support and quality of job design moderate the work stressor to strain relationships in hospital practice?*
4. *Are there any differences in the study variables and in the relationships proposed in the model between those who work in real teams from those who do not?*

Several hypotheses have been devised as part of the investigation to answer the research questions. Figure 4.2 illustrates the structural model with the relevant hypotheses.

Figure 4.2: Illustration of Hypotheses in the Conceptual Framework



4.4 The Conceptual Link: Senior Management Leadership with Social Support and Job Design

Further to the critical review of the literature in chapters two and three, I will specifically focus on the links in the conceptual framework of study one as a background to hypotheses development. An ongoing debate in the leadership literature is whether or not managers and leaders are different, with managers functioning as risk-averse bureaucrats, and leaders being the inspirational visionaries (Zaleznik, Mintzberg, & Gosling, 2003). These authors argued that what organizations really need are people who can be both managers and leaders.

In the UK, Goodwin (2003) indeed referred to effectiveness of senior *managerial leadership* in the NHS as a priority for research and development for health reforms. The influence that senior management leadership can have on employees' work practices and performance has been consistently evidenced empirically (Prabhu & Robson, 2000; Yukl, 2002). Specifically in the health care context, lack of senior leadership support limited the achievement of teams (Borrill et al., 2000; Ovretveit et al., 2002) and individual clinicians (Plsek & Wilson, 2001). The key responsibilities of senior management leadership are to strategically influence the organizational structure and culture, design work practices and roles, and ensure that employees are motivated and satisfied.

The underlying theoretical model of job design is the Job Characteristics Model (JCM) (Hackman & Oldham, 1975; Oldham & Hackman, 1981), which is a frequently-studied model of *motivational job design* that is linked to outcomes such as job satisfaction and productivity. A large body of empirical evidence supports the notion that the way jobs are designed influences outcomes, which are of interest not only to employees, in terms of satisfaction, but also to organizations, in terms of performance. Part of the job design includes job autonomy – a core job characteristic identified by Karasek (1979) as being similar to decision authority and intellectual discretion that characterize decision latitude/control.

Autonomy is the extent to which employees have a major say in scheduling their work, and making on-the-job decisions such as selecting the equipment they will use, and the procedures to be followed. Job design refers to the process of determining the following: the job context, the structure and content for a set of work tasks, how the tasks should be organized, and what linkage should exist between jobs (ISO, 2005). Against this background, I propose the first group of hypotheses.

Hypothesis 1: Quality of senior management leadership is positively associated with social support and quality of job design.

Hypothesis 1a:
Quality of senior management leadership is positively associated with social support as provided by co-workers and supervisors.

Hypothesis 1b:
Quality of senior management leadership is positively associated with the quality of job design in the workplace.

4.5 The Work Stressor-to-Strain Relationships

As already mentioned in chapter two, the work stressor-to-strain relationships in this study are derived from the stimulus-response definition of work stress (Jex, Beehr, & Roberts, 1992). The work *stressors* are the independent variables which, in study one, include quantitative workload and hostility. Quantitative workload has been identified as a major work stressor by Karasek (1998), Spector and Jex (1998), as well as by Gray-Toft and Anderson (1981). Hostility in the workplace is increasingly gaining awareness particularly in the health sector (Cox, Griffiths, & Cox, 1996; Di Martino, 2003). In this study, exploratory factor analysis of the items comprising hostility revealed two constructs, namely external hostility including physical violence, harassment, bullying and abuse by patients, and/or relatives, in contrast to internal hostility, which originates from manager/supervisor and/or colleagues.

With regard to the *response* or *strain* part of the stimulus-response definition, this refers to the physiological, psychological and/or behavioural deviation from an individual's healthy functioning in response to stressors (Cooper, Dewe, & O'Driscoll, 2001; Cooper & Quick, 1999). Study one considers two behavioural measures of strain as dependent variables namely, job satisfaction and intention to leave job.

Research in health care has consistently shown that heavy workload and hostile environment are associated with lower levels of job satisfaction and higher intentions to leave job (Di Martino, 2003; Hetlevik & Hunskar, 2004; Kaarna, Põlluste, Lepnurm, & Thetloff, 2004; Losek, 1994). Furthermore, a longitudinal national survey among general practitioners in England found that job satisfaction was the main factor predicting intention to quit (Sibbald, Bojke, & Gravelle, 2003). Similar findings were found in nurses (Murrells, Clinton, & Robinson, 2005). This leads me to propose hypothesis two.

Hypothesis 2: Work stressor-to-strain relationships.

Quantitative overload and hostile environment (external and internal hostility) are positively associated with staff job dissatisfaction, and the intention to leave job.

4.6 Social Support as a Moderator of the Stressor-to-Strain Relationship

The strong relationship between social support, occupational stress, as well as more specifically the stressor-strain relationship is well documented and evidenced in the literature (Baruch-Feldman, Brondolo, Ben-Dayan, & Schwartz, 2002; Borrill & West, 2003; Bradley & Cartwright, 2002; Ducharme & Martin, 2000; Fenlason & Beehr, 1994). Furthermore, and with even greater relevance vis-a-vis this study, is the empirical evidence of the moderating hypothesis of social support (Cohen & Wills, 1985; Peeters & Le Blanc, 2001). Bliese and Britt (2001) found that the quality of the social environment moderated relationships between work stressors and morale as well as depression. This study aims to contribute further to knowledge by considering two particular work stressors prevalent in hospital practice, namely quantitative overload and hostility. Against this background, the third group of hypotheses is proposed.

Hypothesis 3: Social support will moderate the relationship between work stressors and strains.

Hypothesis 3a:

Perceived quantitative overload will be negatively related to staff job satisfaction in the presence of low social support. In contrast, if social support by supervisors and co-workers is perceived to be high, there will be a small/no relationship between quantitative overload and job satisfaction.

Hypothesis 3b:

Perceived quantitative overload will be positively related to staff intention to leave job in the presence of low social support. In contrast, if social support by supervisors and co-workers is perceived to be high, there will be a small/no relationship between quantitative overload and intention to leave job.

Hypothesis 3c:

Perceived hostility will be negatively related to staff job satisfaction in the presence of low social support. In contrast, if social support by supervisors and co-workers is perceived to be high, there will be a small/no relationship between hostility and job satisfaction.

Hypothesis 3d:

Perceived hostility will be positively related to staff intention to leave job in the presence of low social support. In contrast, if social support by supervisors and co-workers is perceived to be high, there will be a small/no relationship between hostility and intention to leave job.

4.7 Job Design as a Moderator of the Stressor-to-Strain Relationship

The underlying theory that supports job design as a moderator in the stressor-to-strain relationship is the DC/S-model, where the job design characteristic is decision latitude/control. The DC/S-model supports the main effects' hypothesis that high work demands and low autonomy independently cause strain (de Jonge & Kompier, 1997; Van der Doef & Maes, 1999).

The DC/S-model also supports the interaction effects' hypothesis between work demands and autonomy, in that both high work demands with low autonomy as well as low demands with high autonomy result into high strain. The interaction effects' hypotheses involving strain have received very limited support (Peeters & Rutte, 2005). This lack of evidence has prompted researchers to focus more on moderator hypothesis, with social support by far being the most researched. Indeed, it is the aim of both study one and study two (described in later chapters) to contribute to further knowledge in this area. Additionally, in this study, job design is being proposed as the second moderator of the stressor-to-strain relationship, thereby widening the buffering hypothesis even further. The fourth group of hypotheses specifically deals with the moderation hypothesis.

Hypothesis 4: Quality of job design will moderate the relationship between work stressors and strains.

Hypothesis 4a:
Perceived quantitative overload will be negatively related to staff job satisfaction in the presence of low quality of job design. In contrast, if quality of job design is perceived to be high, there will be a small/no relationship between quantitative overload and job satisfaction.

Hypothesis 4b:
Perceived quantitative overload will be positively related to staff intention to leave job in the presence of low quality of job design. In contrast, if quality of job design is perceived to be high, there will be a small/no relationship between quantitative overload and intention to leave job.

Hypothesis 4c:
Perceived hostility will be negatively related to staff job satisfaction in the presence of low quality of job design. In contrast, if quality of job design is perceived to be high, there will be a small/no relationship between hostility and job satisfaction.

Hypothesis 4d:
Perceived hostility will be positively related to staff intention to leave job in the presence of low quality of job design. In contrast, if quality of job design is perceived to be high, there will be a small/no relationship between hostility and intention to leave job.

4.8 The Impact of Team Structure on the Conceptual Model

A prominent study that examined the influence of team working in health care was the one by Borrill et al. (2000), which examined 500 NHS teams in primary health care, community mental health, acute hospitals and breast cancer care. This revealed strong evidence that working in real or well-structured teams was associated with higher quality and innovation of patient care, as well as with better staff well-being and staff retention. Other studies linked team working in primary health care with lower hospitalization rates (Sommers et al., 2000) and in operating theatres with lower error rates (Sexton, Thomas, & Helmreich, 2000).

Hypothesis 5: Those working in real teams have higher levels of quality of senior management leadership, social support, job design and job satisfaction. On the other hand, they perceive lower levels of work stressors and intention to leave job. Furthermore, working in real teams will influence the relationships tested in the above hypotheses.

4.9 Methods

4.9.1 Description of Sample

The number of questionnaires in the acute/specialist trusts amounted to 124,373 questionnaires in 152 acute trusts and 13, 841 questionnaires in 20 specialist acute trusts. Both full time and part time members of staff, who were directly employed by the trusts on September 29th 2003, were eligible for the survey. This included Trust employees on all types of contract (permanent, fixed period, locum, temporary, seconded staff). The response rate in acute and specialist trusts was 53%. Therefore, the number of respondents amounts to 65,142. Table 4.1 shows the age profile of the NHS staff in the acute/specialist trusts. The highest percentages namely 28% and 30 %

lie in the 41-50 year and 31-40 year age groups respectively. Table 4.2 shows the gender profile, and like the rest of the NHS areas, there are 81 % females and 19% males in the acute/specialist trusts. Table 4.3 shows the occupational categories of health care employees in acute/specialist trusts, the highest being registered nurses followed by administration and clerical staff.

Table 4.1
Age profile of NHS staff in the acute/specialist trusts

Age in years	Percentage
16-20 years	1.0%
21-30 years	18%
31-40 years	28%
41-50 years	30%
51-65 years	23%
Over 66 years	<0.5%
Did not say	2%

Source: NHS staff survey, 2004

Table 4.2
Gender profile of NHS staff in the acute/specialist trusts

Gender	Percentage
Male	19%
Female	81%

Source: NHS staff survey, 2004

Table 4.3
Occupational group profile of NHS staff in the acute/specialist trusts

Occupational group profile	Percentage
Nursing (registered)	28.4%
Nursing (unregistered)	2.1%
Midwife	3.4%
Health Care Assistant	6.9%
Allied Health Professionals	8.8%
Medical/Dental (consultant)	4.1%
Medical/Dental (other)	4.2%
General management	2.8%
Scientific & technical	7.1%
Admin & clerical	21.7%
Maintenance/ancillary	5.8%
Other	4.7%
Did not say	2%

Source: NHS staff survey, 2004

4.9.2 Measures

The items are taken from the NHS Staff Survey (2004), and for this investigation they include measures for team structure, quality of senior management leadership, social support, job design, quantitative overload, hostility, job satisfaction, and intention to leave job.

Team structure:

Respondents were at the first instance asked whether or not they worked in a team. Those that answered "yes" were asked three further questions regarded as criteria for real teams that are related to team members' working closely, clarity of objectives, and the occurrence of regular meetings. However, only those that fulfilled these three criteria and who also stated that they worked in teams less than 15 members were judged to be in real teams. Therefore, three groups are created: those that do not work in teams, pseudo teams – those that claim work in teams but do not fulfil all three criteria and real teams.

***Quality of senior management leadership* (QSML):**

A five-item measure with three possible responses that is "yes/no/don't know, was used to assess the quality of senior management leadership. The items included assessing senior management on setting vision, support for new ideas, as well as a focus on patients' needs, relationships with community and with other organizations. Cronbach's alpha for the five items was 0.81. A scale was developed from these five items with scores ranging from 1 to 5 depending on the 'yes' responses to each item, with the result that quality of senior management leadership is reflected as a one-item scale. So as to avoid overlap of content in the variables of interest, participants were specifically asked questions on senior management as opposed to those related to job design and social support, which referred to the supervisor.

***Social support* (SS):**

So as to avoid overlap of content with team structure, I eliminated the item "Supervisor ensures clarity of job", thereby leaving social support with four items. It deals with both co-worker support and supervisor support. Utilizing the five-point Likert scale ranging from very dissatisfied to very satisfied, respondents were asked to rate satisfaction with the "support from work colleagues"; and to rate statements on supervisor support ranging from strongly disagree to strongly agree such as: "... asks for my opinion", and "...can be counted on to help me with a difficult task at work". Cronbach's alpha for the four items was 0.77.

***Job design* (JD):**

Job design refers to the context and structure of the work job. As with social support, to avoid overlap of content with team structure, I eliminated the item "I have clear, planned goals and objectives for my job", leaving job design with five items and it deals mainly with job control and decision latitude. Utilizing the five point Likert scale, respondents indicated the extent to which they agreed or disagreed with items such as "I am involved in deciding on the changes introduced that affect my work area/team/department", and "I am consulted about changes that affect my work area/team/department".. Cronbach's alpha for the five items was 0.73.

Work stressors:

Work stressors were measured using five dimensions: three dimensions that form the construct quantitative overload, and two dimensions that form the construct hostile environment.

Quantitative overload (QO) was measured using: a) *working extra hours* for which respondents had to choose from seven options from 0 hours per week to more than 25 hours per week. b) *Social pressures to work extra hours*, which was developed into a scale from 6 dichotomous (yes/no) items in response to statement "I work more than my contracted hours..." Two examples of these items are: "...because it is expected by my manager", and "...because I want to provide the best care I can for patients". c) *Work pressure felt by staff* which has two 5 point Likert scale items has a Cronbach's alpha of 0.77. Respondents indicated the extent to which they agreed or disagreed with "I cannot meet all the conflicting demands on my time at work" and "I do not have time to carry out all my work".

Hostility (HO) was identified in terms of two constructs, namely external hostility and internal hostility. External and internal hostility were developed into two separate scales from 4 dichotomous (yes/no) items, in response to the question "In the past 12 months have you experienced physical violence and or harassment, bullying and abuse from any of the following?" For external hostility, the items referred to patients and relatives whereas for internal hostility, the items referred to manager/supervisor and colleagues.

The underlying structure for work stressors was tested using split file analysis with exploratory factor analysis on the first half of the data identifying the two constructs, namely quantitative overload and hostility. Confirmatory factor analysis (CFA) on the second half of the data confirmed the underlying factor structure with good model fit indices CFI= 0.957; RMSEA=0.041, with 90% CI of 0.037 and 0.046.

Strains:

Work strains were measured using two dimensions, namely job satisfaction, and intention to leave jobs. The construct *job satisfaction* (JS) is measured using four items taken from the scale by Warr, Cook and Wall (1979), and has a Cronbach's alpha of 0.87. In answering the question "How satisfied are you with each of the following areas of your job?", respondents indicated the extent to which they were satisfied or dissatisfied to five-point Likert scale items such as "The amount of responsibility I am given" and "The freedom I have to choose my own method of working".

The construct *intention to leave jobs* (Intlve) is measured using three items, with a Cronbach's alpha of 0.92. Respondents indicated the extent to which they agreed or disagreed with items such as "I often think about leaving my current employer". Exploratory factor analysis using Maximum likelihood was carried out on half of the data using the nine items as measures of the theoretically derived construct strains. This clearly showed two factors: identified as job satisfaction and intention to leave jobs, with six and three manifest variables strongly loading on the two factors respectively. The underlying factor structure was confirmed using confirmatory factor analysis on the second half of the data.

4.9.3 Analysis

The analysis was conducted in three stages to test the five groups of hypotheses. SPSS 14 and AMOS 6.0 (Analysis of Moment structures) software packages (Arbuckle, 2006) were used for this study.

The first stage used a multi-group structural equation-modelling design with cross-sectional samples of those who perceive themselves as working in real teams (n=21,201), those working in no team (n=8013), and those in pseudo teams (n=25,988). 9,940 (15.3%) did not respond to the items on team structure. In line with Byrne's recommendations, on seeking evidence of multi-group invariance in factorial and causal structure (2001), several questions need to be considered:

1. Is the factorial structure of the conceptual framework equivalent across teams?
2. Are the paths in the causal structure invariant across team structure?
3. Are the latent means of the constructs different across team structure?

The estimation of the baseline models does not involve between-group constraints, and therefore, it can be analysed separately for each group (Byrne, 2001). However, to test for invariance, equality constraints need to be imposed, such as those based on the seminal work by Joreskog and colleagues, and the data for all groups must be analysed simultaneously to obtain efficient estimates (Bentler, 1995; Joreskog & Sorbom, 1996). The testing for invariance starts with a global test of the equality of covariance structures across groups. The null hypothesis argues for the non-equivalence of the groups. If the null hypothesis is rejected, then one proceeds with subsequent testing of increasingly restrictive hypotheses so as to identify the source of non-invariance (Byrne, 2001).

The second stage involved a one-way between groups multivariate analysis of variance aimed at investigating team structure differences in the study variables. Seven dependent variables were used: quality of senior management leadership, social support, job design, quantitative overload, hostility, job satisfaction, and staff intention to leave job. The independent variable was team structure: no team, pseudo team and real team. Preliminary assumption testing was conducted to check for normality, linearity, and multicollinearity with no violation. The data was checked for univariate and multivariate outliers, which were eliminated. Because of the huge sample sizes, equality of covariance matrices and equality of error variances were violated so much so that a more conservative alpha level is needed to determine significance ($p<.0001$).

The third stage involved testing for moderation using regression analysis. Moderated multiple regression (Baron & Kenny, 1986; Cohen, Cohen, West, & Aiken, 2003) analyses were conducted to examine the hypothesized moderated relationships. Subsets were entered into hierarchical regressions of (1) demographic control variables namely age, gender and occupational group (2) quantitative overload and hostility as independent variables and, social support and job design as moderators (3) two-way interactions between independent variables and moderators. Standardized versions of the independent variables and moderators were created to minimise the risk of multicollinearity (Cohen et al., 2003). Interaction terms were then computed by multiplying together the standardized versions of the independent variable with the moderator. A regression analysis was run with the standardised independent variable, the standardised moderator and the interaction term. Both the dependent variable and the interaction term in each relationship were not standardised. The coefficient tables are then analysed to look for the statistical significance of the interaction terms, a requirement needed to confirm a moderator hypothesis.

4.10 Results

4.10.1 Descriptive Statistics

Team structure

14.9% of the sample did not work in teams, in contrast to 38.6% that worked in well-structured teams and 46.5% that worked in pseudo teams. There were no meaningful differences in terms of proportions between those in real teams versus those in no team and in pseudo teams when comparing the three groups by age, gender, ethnic background, disability, job tenure, or work-time contract. With regard to occupational groups (Figure 4.3 and Table 4.4), general managers are the most likely to work in real teams (62%) whereas the least likely are the maintenance staff (23%). All other groups ranged between 35% and 48%.

Figure 4.3: Team Structure in the Occupational Groups

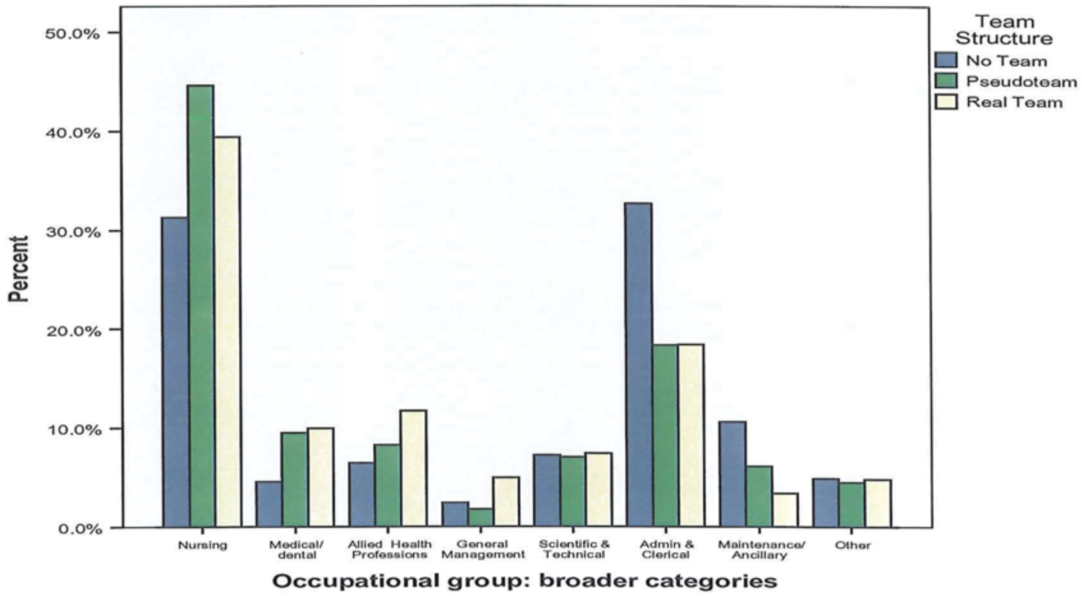


Table 4.4
Occupational group profile of NHS staff in well-structured teams vs. those in pseudo teams/not working in teams

		Percent Team Structure		
		No team	**Pseudo Team**	**Real team**
Occupational group: broader categories	**Nursing**	**11.1%**	**51.6%**	**37.2%**
	Medical/dental	**7.4%**	**49.9%**	**42.8%**
	Allied Health Professions	**10.0%**	**41.8%**	**48.2%**
	General management	**11.4%**	**26.8%**	**61.8%**
	Scientific & technical	**14.5%**	**45.9%**	**39.6%**
	Admin & clerical	**23.2%**	**42.2%**	**34.7%**
	Maintenance/ancillary	**27.0%**	**50.3%**	**22.7%**
	Other	**15.3%**	**45.0%**	**39.8%**
Total		**14.5%**	**47.1%**	**38.4%**

Table 4.5 shows the means, standard deviations, differences between means and correlations between variables in the model across the three groups of team structure. Most of the study variables are moderately correlated.

Table 4.5

Means, standard deviations, differences between means, and inter-correlations among study variables for those in no team (n= 8031), pseudo team (n= 25,988) and those in real teams (n=21,201).

		No Team		Pseudo Team		Real Team				CORRELATIONS					
Variable	Team Structure	Mean	SD	Mean	SD	Mean	SD	Significance (Partial Eta Squared – Effect Size) ±	F(df)	1	2	3	4	5	6
1. Quality of senior management leadership	No Team	1.87	1.85					.000 (.040 –small to moderate)	681.33 (5, 50682)						
	Pseudo Team			1.94	1.82										
	Real Team					2.70	1.89								
2. Social support	No Team	3.30	.79					.000 (.083 – moderate to large)	1647.52 (5, 50682)	.32**					
	Pseudo Team			3.37	.79					.29**					
	Real Team					3.80	.69			.25**					
3. Job design	No Team	3.07	.73					.000 (.095 – moderate to large)	2683.54 (5, 50682)	.35**	.63**				
	Pseudo Team			3.03	.74					.33**	.63**				
	Real Team					3.54	.65			.31**	.61**				
4. Quantitative overload	No Team	2.18	.87					.000 (.010 - small)	40.20 (5, 31073)	.03*	-.07**	-.05**			
	Pseudo Team			2.44	.92					.00	-.07**	-.09**			
	Real Team					2.43	.92			-.02*	-.15**	-.09**			
5. Hostility	No Team	.32	.56					.000 (.017- small)	112.95 (5, 31073)	-.05*	-.21**	-.18**	.20**		
	Pseudo Team			.50	.67					-.05**	-.17**	-.15**	.19**		
	Real Team					.35	.57			-.07**	-.17**	-.12**	.15**		
6. Job satisfaction	No Team	3.34	.82					.000 (.071 - moderate)	626.78 (5, 31073)	.33**	.69**	.64**	-.16**	-.28**	
	Pseudo Team			3.24	.82					.30**	.68**	.64**	-.15**	-.24**	
	Real Team					3.70	.71			.29**	.63**	.62**	-.15**	-.20**	
7. Staff intention to leave jobs	No Team	2.65	1.10					.000 (.031 - small to moderate)	292.69 (5, 31073)	-.24**	-.43**	-.43**	.19**	.24**	-.53**
	Pseudo Team			2.83	1.14					-.22**	-.40**	-.43**	.15**	.22**	-.53**
	Real Team					2.41	1.03			-.22**	-.39**	-.37**	.16**	.18**	-.49**

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed) ± Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988).

The set of multivariate tests of significance, namely Wilk's lambda (.857) and Pillai's trace (.146) with significance value of $p<.0001$, shows statistically significant differences between those in real teams, pseudo team and no team. The results show statistically significant differences across all variables, with those in real teams having higher means for quality of senior management leadership, social support, job design and job satisfaction, and lower means for work stressors and staff intention to leave job. However, p values do not provide the strength of association between variables.

Additionally, with large samples, even very small differences can become statistically significant. Therefore, the strength of the association or *the effect size* is calculated using *eta squared* (Table 4.5). The strength varies from small to more than moderate effect (Cohen, 1988). This supports hypothesis 5. An interesting finding is that those in pseudo teams have lower levels of job satisfaction and higher levels of intention to leave job than those that do not work in a team at all. Therefore, the study shows that those in pseudo teams show higher levels of strain than those in no team.

4.10.2 Structural Equation Modelling

Structural equation modelling was specifically chosen for this analysis because of its ability to manage complex models with observed and latent variables, measurement error, and multiple groups. The models include several latent constructs. I consulted the literature on the controversial issue of using parcels as manifest variables in structural equation modelling (Little, Cunningham, Shahar, & Widaman, 2002). In this study, I chose the pragmatic-liberal philosophical perspective in that parcels have potential merits as the lowest level of data to be modelled. For example, work stressors and strains were inserted in the path models, as latent constructs on the basis that different work stressors and psychological strains could be clustered. Through structural modelling, I could then estimate work stressor-to-strain relationships across the groups of team structure. The empirical justifications in favour of parcelling are the distinct psychometric properties of the latent constructs, and the factor solution and model-fit characteristics achieved. Therefore, the models are more parsimonious, and have been checked for dual loadings, thereby resulting in a reduction of sampling error (MacCallum et al. 1999). The psychometric considerations are that work stressors and strains are more representative of the constructs intended to be measured in the conceptual framework, and that individual item scores are statistically less reliable than aggregate scores (Little et al. 2002). The model-level consideration is that parcels can be used effectively to reduce the number of indicators to an optimal, just-identified level, thereby reducing type 1 error (Little et al. 2002).

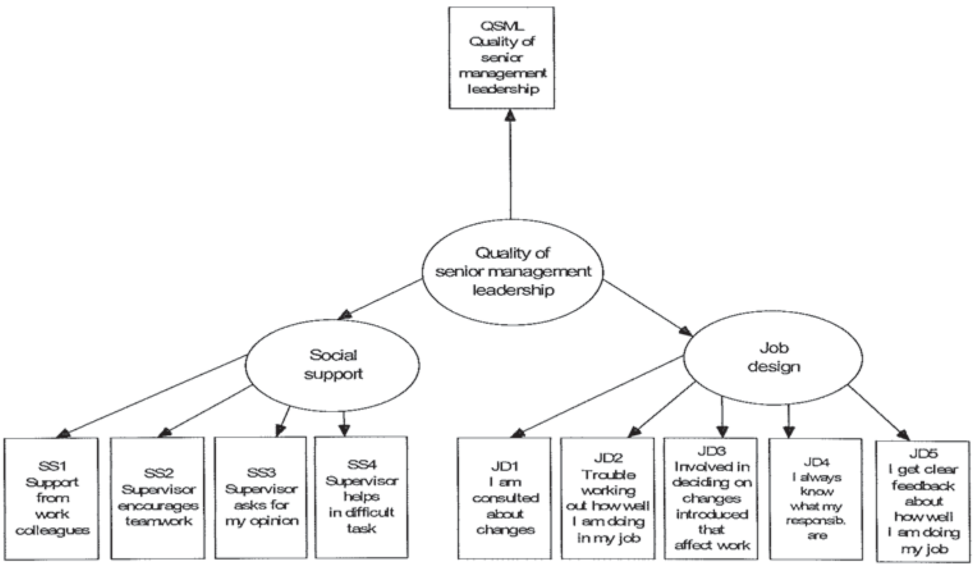
In summary, the use of latent constructs in this study was warranted as my goal was to model the effects of work stressors and strains at a level of generality, so that with the appropriate parcelling of items, I could minimise the effects of nuisance factors at a lower level of generality. This I achieved by pre-screening the items in exploratory factor analysis on a randomly selected half of the data set. The exploratory factor analysis algorithm uses an iterative estimator with an oblique rotation, and is a similar algorithm to the SEM measurement model.

Structural equation modelling has the ability to isolate measurement error, which is a ubiquitous threat to validity, by segregating reliable true variance from measurement error variance. Additionally, it was needed to test whether the hypothesised model fits and is supported by empirical data.

4.10.2.1 Model Specification and Measures

The proposed model (Figure 4.1, p.126) was specified with its measurement and structural coefficients constrained to equality to test its structural invariance across team structure. Specifically, the direction of the paths was specified to be equal across team structure. The model was analyzed in two parts: the first (Figure 4.4) is that quality of senior management leadership predicts social support and job design; the second (Figure 4.5) being the causal link between work stressors and strains. The hypothesised casual model (Figure 4.4) was tested against two-factor structure measurement models (SS, and JD) and a null-factor model (the data does not yield a single factor).

Figure 4.4: Hypothesised Model of Quality of Senior Management Leadership Predicting Social Support and Job Design



The improvement of model fit was tested by calculating the differences in χ^2 values to degrees of freedom (χ^2/df) for each model. The test indicates a significant model improvement for the causal model over the null model suggesting that the causal model fits the data better (Table 4.6).

Table 4.6
Model fit indices of the causal model (Quality of senior management leadership predicting social support and job design) for all respondents

	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	χ^2/df
Null model	188963.90	55			0.230 (0.229, 0.230)	3435.71
Two-factor measurement model [a] (Social Support and Job Design: Correlated)	9749.50	26	0.95	0.91	0.076 (0.075, 0.077)	374.98
Three-factor measurement model [b] (Quality of Senior Management Leadership, Social Support and Job Design: Correlated)	14991.28	34	0.92	0.87	0.082(0.081, 0.083)	440.92
Causal model (Figure 4.4) [c]	9913.70	33	0.95	0.91	0.068 (0.067, 0.069)	300.41

N=65,142; CFI- Comparative fit index; TLI= Tucker Lewis index; RMSEA = Root mean square error of approximation; df= Degrees of freedom.
[a] *Difference two-factor model (correlated) and null model: $\Delta\chi^2$ (df) = 17921.4(29)****
[b] *Difference between three-factor and two-factor measurement (correlated) models: $\Delta\chi^2$ (df)=5241.78(8)****
[c] *Difference between causal and three-factor measurement models: $\Delta\chi^2$ (df) =24904.98(1) ****

**** p<.001*

Similarly, the hypothesised casual model (Figure 4.5, overleaf) was tested against four-factor structure measurement models (QO, HO, JS and Intlve) and a null-factor model. The test indicates a significant model improvement for the causal model over the null model (Table 4.7), suggesting that the causal model fits the data better. As expected, the measurement model fits the data best. The data was tested for multivariate normality. Mardia's measure of multivariate normality based on skewness and kurtosis is 40.35 ($p < 0.05$), which means significant non-normality. However, considering the very large sample sizes in this study, violation of normality assumption is expected and Maximum Likelihood is shown to be robust with sample sizes of few hundreds (Curan, West & Finch, 1996; Kupek, 2002).

Figure 4.5: Hypothesised model for the stressor-strain relationship

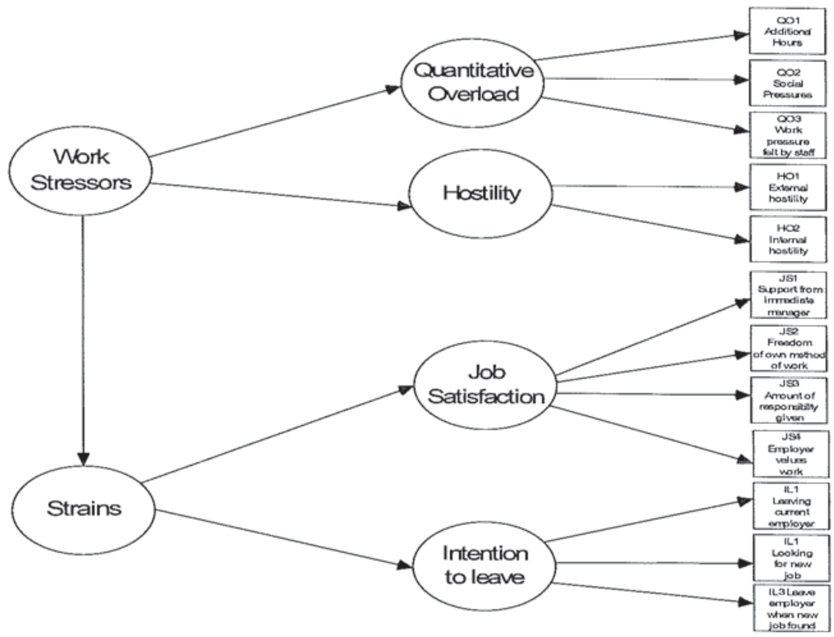


Table 4.7
Model fit indices of the causal model (work stressors-to-strains) for all respondents, over the four-factor measurement model

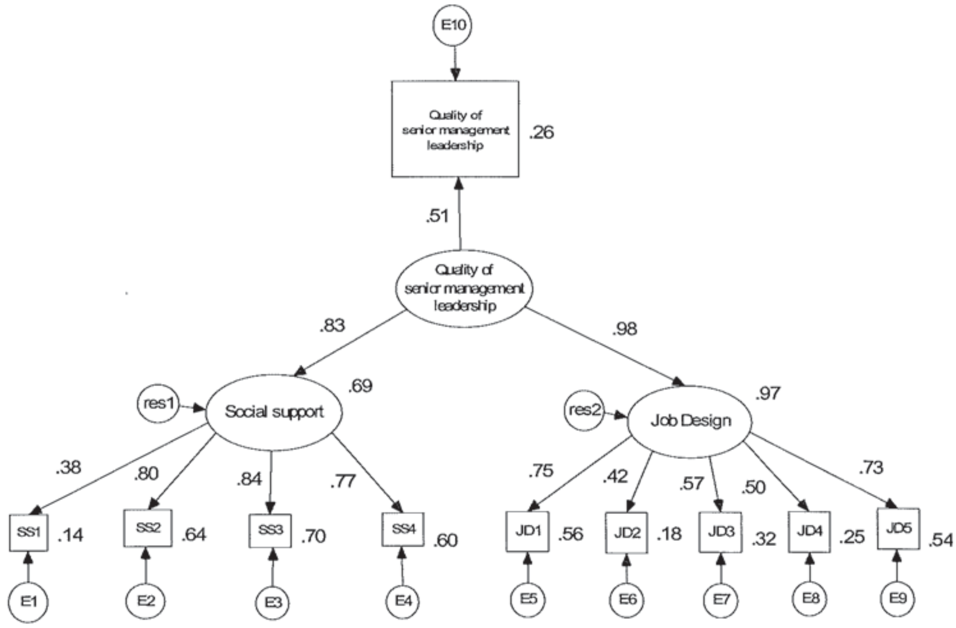
	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	χ^2/df
Null model	**260648.79**	**78**			**0.226 (0.226, 0.227)**	**3341.65**
Four-factor measurement model (correlated)[a]	**10760.60**	**48**	**0.96**	**0.93**	**0.059 (0.058, 0.059)**	**224.18**
Causal model (Figure 4.5)[b]	**14141.60**	**52**	**0.95**	**0.92**	**0.064 (0.064, 0.065)**	**271.95**

N=65,142; CFI- Comparative fit index; TLI= Tucker Lewis index; RMSEA = Root mean square error of approximation; df= Degrees of freedom.
*[a] Difference four-factor (correlated) and null models: $\Delta\chi^2$ (df)= 249888.19(30)****
*[b] Difference causal and four-factor (correlated) models: $\Delta\chi^2$ (df)=3381(4)****
*Difference causal and null models: $\Delta\chi^2$ (df) =246507.19(26) ****
**** p<.001*

4.10.2.1.1 Quality of Senior Management Leadership Associated with Social Support and Job Design

Evidence converged in support of the proposed model and its robustness across team structure. Quality of senior management leadership significantly influenced social support and job design. Furthermore, the direction, strength and significance of all parameter estimates were consistent with theory and across team structure (Figure 4.6, overleaf). QSML explained 73% and 95% of the variance of SS and JD respectively for all groups. There appears to be lack of discriminant validity between QSML and SS/JD, even though the questionnaire distinctly refers to senior management and supervisor respectively. This may be due to participants failing to differentiate between the actions of senior management from those of their immediate supervisors. Another possible explanation may be that the model is limited by the single-item measurement of *Quality of Senior Management Leadership* (QSML).

Figure 4.6: Standardised Estimates for all Respondents in the Model of Quality of Senior Management Leadership Predicting Social Support and Job Design



The baseline models' fit statistics (Table 4.8) show a good model fit for all respondents. High χ^2/df ratios are expected because of the large sample sizes. The good fit statistics for the baseline models do not guarantee equivalence of underlying theoretical structure across the three groups. Indeed, testing for the validity of the factorial/causal structure necessitates testing the three groups simultaneously.

Table 4.8
Causal model fit statistics of the baseline causal models (Quality of senior management leadership predicting social support and job design).

	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	χ^2/df
All respondents	0.94	0.90	0.070 (0.068, 0.071)	384.79
No Team	0.93	0.89	0.072 (0.066, 0.075)	48.23
Pseudo Team	0.93	0.89	0.069(0.067, 0.073)	155.95
Real team	0.93	0.89	0.069 (0.068, 0.072)	96.31

The χ^2 statistics are summative and equal to the sum of χ^2 statistics obtained in the baseline models. Testing for invariance of parameters across groups is accomplished by placing constraints on parameters, factor loadings, and structural paths (Byrne, 2001). Cross-sectional factorial invariance concerns the invariance of corresponding parameters across independent population groups (Gregorich, 2006).

Gregorich (2006) identified a nested hierarchy primarily represented by increasing levels of cross-group equality constraints imposed on factor loading, item intercept, and residual variance parameters. These are dimensional, configural, metric (or pattern), strong factorial (or scalar), and strict factorial invariance. As the concern in this study is merely testing invariance of structural relationships, then metric variance is sufficient (Gregorich, 2006). Dimensional or metric invariance simply requires that an instrument represents the same number of common factors across groups.

Table 4.9 (overleaf) shows the goodness-of-fit statistics for tests of invariance across different groups of team structures. The results show the conceptual framework's robustness across team structure. However, the comparison between the unconstrained and constrained models shows statistically significant χ^2 difference tests. Provided with this information, one can therefore conclude that the equality constraints do not hold across the three groups of team structure, so much so that there are differences between those that work in real teams from those that do not.

Table 4.9

Goodness-of-Fit Statistics for the Causal model (Quality of senior management leadership predicting social support and job design) across Three Groups of Team Structure namely, those working in real teams, pseudo teams and those not working in teams.

Model Description	Groups	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	χ^2/df	$\Delta\chi^2$	Δ *df*	Statistical Significance
Hypothesised *Model 1* (Figure 4.6) Unconstrained model	No team/Pseudo/Real Team	10957.03	99	0.93	0.89	0.045 (0.040, 0.046)	110.68	-	-	-
Factor loadings, variances, structural paths constrained	No team/Pseudo/Real Team	14860.21	120	0.91	0.88	0.047 (0.047, 0.049)	123.84	3903.18	21	$p < .001$
Factor loadings, constrained	No team/Pseudo/Real Team	11383.14	113	0.93	0.90	0.043 (0.042, 0.043)	100.74	426.11	14	$p < .001$
Structural paths constrained	No team/Pseudo/Real Team	11026.40	103	0.93	0.90	0.044 (0.043, 0.045)	117.38	69.37	4	$p < .001$
Model 1a Unconstrained model	No team/Pseudoteam	6739.05	66	0.94	0.90	0.055 (0.043, 0.056)	102.11	-	-	-
Model 1a with constraints on factor loadings, variance and structural paths	No team/Pseudoteam	9009.58	78	0.92	0.88	0.058 (0.057, 0.059)	115.51	2270.53	12	$p < .001$
Factor loadings, constrained	No team/Pseudoteam	6781.66	73	0.94	0.90	0.052 (0.051, 0.053)	92.90	42.61	7	$p < .001$
Structural paths constrained	No team/Pseudoteam	6756.01	68	0.93	0.90	0.054(0.051, 0.055)	99.35	16.96	2	$p < .001$
Model 1b Unconstrained model	No team/Real Team	6739.77	66	0.93	0.90	0.054 (0.051, 0.056)	100.59	-	-	-
Model 1b with constraints on factor loadings, variance and structural paths	No team/Real Team	7990.59	78	0.91	0.87	0.059 (0.058, 0.060)	102.44	1250.82	12	$p < .001$
Factor loadings, constrained	No team/Real Team	6040.34	73	0.93	0.90	0.053 (0.048, 0.054)	82.74	699.43	7	$p < .001$
Structural paths constrained	No team/Real Team	5864.91	68	0.93	0.89	0.054 (0.053, 0.055)	86.25	125.14	2	$p < .001$
Model 1c Unconstrained model	Pseudo/Real Team	9365.48	66	0.93	0.89	0.055 (0.054, 0.056)	141.90	-	-	-
Model 1c with constraints on factor loadings, variance and structural paths	Pseudo/Real Team	9315.15	78	0.91	0.86	0.060 (0.059, 0.060)	168.60	50.33	12	$p < .01$
Factor loadings, constrained	Pseudo/Real Team	9697.31	73	0.93	0.89	0.053(0.052, 0.054)	132.84	331.83	7	$p < .001$
Structural paths constrained	Pseudo/Real Team	9400.50	68	0.93	0.89	0.054 (0.053, 0.055)	138.24	35.02	2	$p < .001$

Δ *df:* Difference in number of degrees of freedom between models. *All models are compared with their respective unconstrained model.*

$\Delta\chi^2$: Difference in χ^2 values between models. *All models are compared with their respective unconstrained model.*

Figure 4.7: Standardised Estimates for the Unconstrained Models across Team Structure

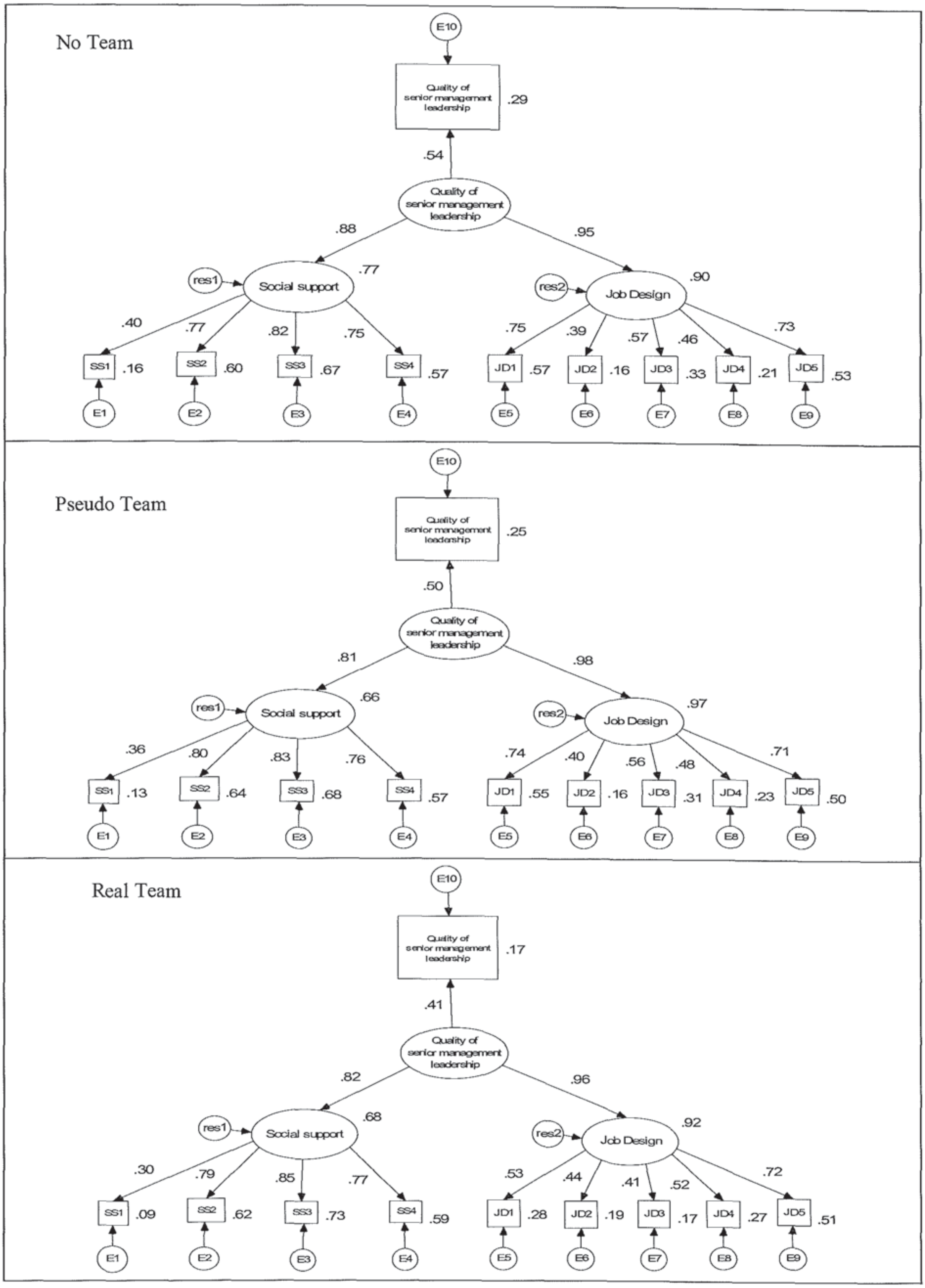


Figure 4.7 (p. 152) compares the standardised estimates for the three groups, with some noticeable differences, but very similar patterns. The first hypothesis *that quality of senior management leadership is associated with social support and quality of job design* has been supported. Goodness-of-fit measures show that this association occurs across the three groups of team structure. However, there is factorial and structural non-equivalence across the three groups.

4.10.2.1.2 Work Stressor-to-Strain Relationships

For the stressor-to-strain relationship in the model, evidence converged in support of the proposed model and its robustness across team structure. Work stressors significantly influenced strains. Furthermore, the direction, strength and significance of all parameter estimates were consistent with theory and across team structure (Figure 4.8).

Figure 4.8: Standardised estimates for all respondents (work stressors-to-strains relationship) (Job satisfaction was reverse-coded to get all strains in the same direction)

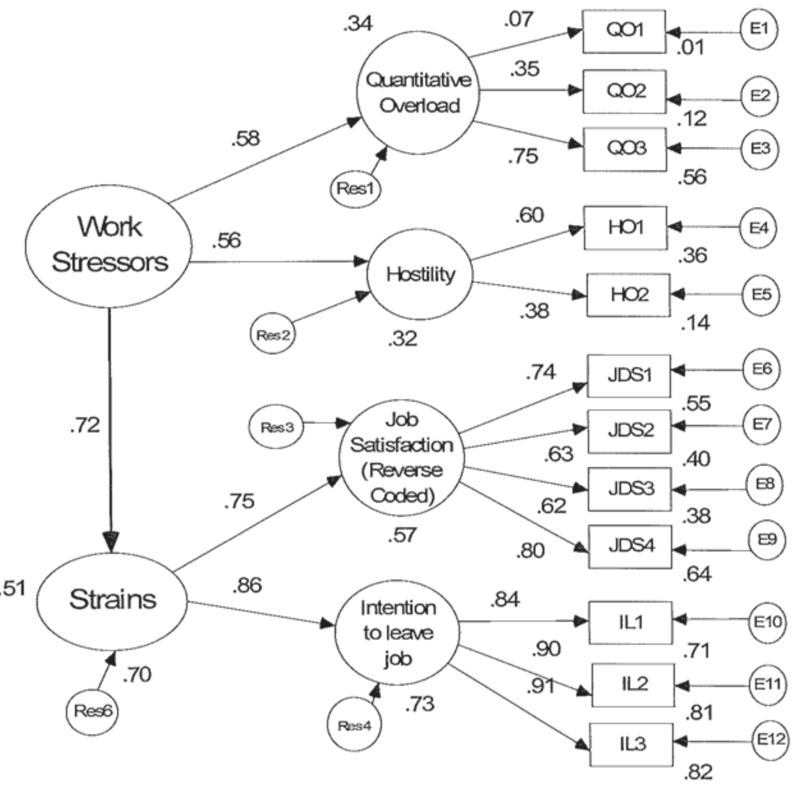


Table 4.10
Causal model fit statistics of the baseline causal models (Work Stressor-to-Strain Relationships)

	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
All respondents	**0.95**	**0.92**	**0.064 (0.064, 0.065)**	**272.0**
No team	**0.95**	**0.92**	**0.065 (0.063, 0.068)**	**35.23**
Pseudo team	**0.94**	**0.92**	**0.064 (0.063, 0.066)**	**108.34**
Real team	**0.94**	**0.91**	**0.064 (0.062, 0.065)**	**87.30**

The good fit statistics for the baseline models (Table 4.10) do not guarantee equivalence of underlying theoretical structure across the three groups of team structure. Therefore I tested the causal model with the three groups simultaneously. Table 4.11 (overleaf) shows the goodness-of-fit statistics for tests of invariance across different groups of team structures. The results show the conceptual framework's robustness across team structure. However, the comparison between the unconstrained and constrained models shows statistically significant χ^2 difference tests. Therefore provided with this information, one can conclude that the equality constraints, except the stressor-strain path between no and pseudo team groups, do not hold across the three groups of team structure, such that there are differences between those that work in real teams from those that do not.

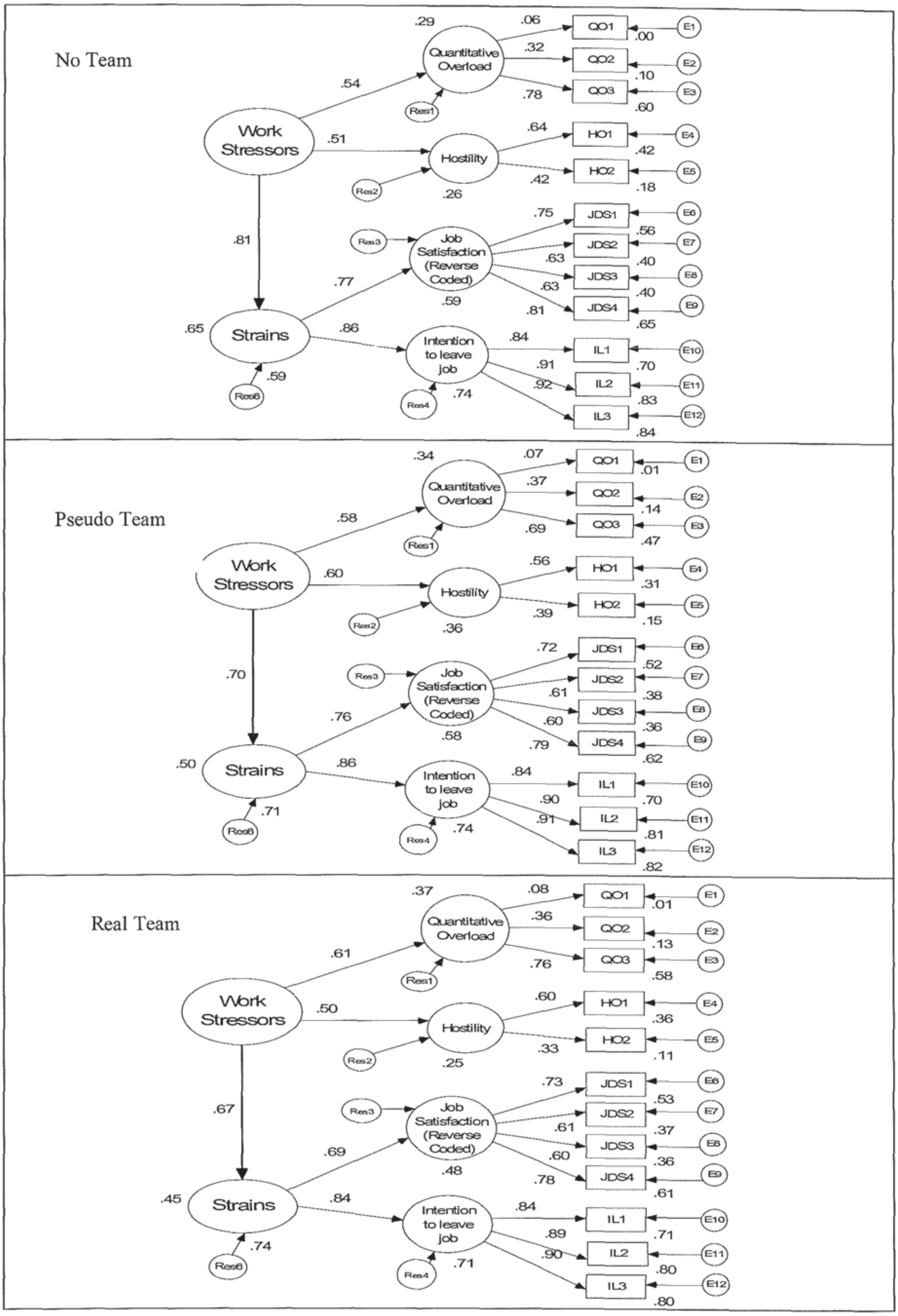
Figure 4.9 (p. 156) compares the standardised estimates for the unconstrained models of the three groups, with noticeable differences in the estimates, but very similar patterns. However, the pattern that those in pseudo teams fared worse that those in no team was not replicated in the work-stressor-strain paths which shows a standardised estimate of 0.81 for no team; 0.70 for pseudo team, and 0.67 for real teams. This means that when stressors go up by one standard deviation, strains go up by 0.81 (no team), 0.70 (pseudoteam), and 0.67 (real team) standard deviations respectively.

Table 4.11
Goodness-of-Fit Statistics for the Work Stressor-to-Strain Relationships across Three Groups of Team Structure.

Model Description	Groups	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	χ^2/df	$\Delta\chi^2$	Δ *df*	Statistical Significance
Hypothesised *Model 1* (Figure 4.6) Unconstrained model	No/Pseudo/Real team	12097.91	158	0.94	0.92	0.037 (0.036, 0.038)	76.57	-	-	-
Factor loadings, variances, structural paths constrained	No/Pseudo/Real team	21291.06	183	0.90	0.87	0.046 (0.045, 0.046)	116.35	9193.15	25	$p < .001$
Factor loadings, constrained	No/Pseudo/Real team	12305.62	174	0.94	0.92	0.036 (0.035, 0.035)	70.72	207.71	16	$p < .001$
Structural paths constrained	No/Pseudo/Real team	12188.90	164	0.94	0.92	0.036 (0.036, 0.037)	74.32	90.93	6	$p < .001$
Stressor-strain path constrained	No/Pseudo/Real team	12113.47	160	0.94	0.92	0.037 (0.036, 0.037)	75.71	15.56	2	$p < .001$
Model 1a Unconstrained model	No team/Pseudoteam	7465.46	105	0.95	0.92	0.045 (0.045, 0.046)	71.10	-	-	-
Model 1a with constraints on factor loadings, variance and structural paths	No team/Pseudoteam	12239.06	119	0.91	0.88	0.055 (0.054, 0.056)	102.85	4773.6	14	$p < .001$
Factor loadings, constrained	No team/Pseudoteam	7481.83	113	0.95	0.92	0.044 (0.043, 0.045)	66.21	16.37	8	$p < .05$
Structural paths constrained	No team/Pseudoteam	7487.63	108	0.95	0.92	0.045 (0.044, 0.046)	69.33	36	3	$p < .001$
Stressor-strain path constrained	No team/Pseudoteam	7468.42	106	0.95	0.92	0.045 (0.044, 0.046)	70.46	2.96	1	*NS*
Model 1b Unconstrained model	No team/Real Team	6420.08	105	0.94	0.92	0.045 (0.044, 0.046)	61.14	-	-	-
Model 1b with constraints on factor loadings, variance and structural paths	No team/Real Team	12216.26	119	0.89	0.86	0.059 (0.058, 0.060)	102.66	5796.18	14	$p < .001$
Factor loadings, constrained	No team/Real Team	6510.04	113	0.94	0.92	0.044 (0.043, 0.045)	57.61	89.96	8	$p < .001$
Structural paths constrained	No team/Real Team	6468.72	108	0.94	0.92	0.045 (0.044, 0.046)	59.90	48.64	3	$p < .001$
Stressor-strain path constrained	No team/Real Team	6434.39	106	0.94	0.92	0.045 (0.044, 0.046)	60.70	14.31	1	$p < .001$
Model 1c Unconstrained model	Pseudo/Real Team	10252.21	105	0.94	0.91	0.045 (0.045, 0.046)	97.64	-	-	-
Model 1c with constraints on factor loadings, variance and structural paths	Pseudo/Real Team	17903.56	119	0.90	0.87	0.056 (0.056, 0.057)	150.45	7651.35	14	$p < .001$
Factor loadings, constrained	Pseudo/Real Team	10430.25	113	0.94	0.92	0.044 (0.043, 0.045)	92.30	178.04	8	$p < .001$
Structural paths constrained	Pseudo/Real Team	10313.51	108	0.94	0.92	0.045 (0.044, 0.045)	95.50	61.3	3	$p < .001$
Stressor-strain path constrained	Pseudo/Real Team	10260.09	106	0.94	0.92	0.045 (0.044, 0.045)	96.79	7.88	1	$p < .01$

Δ *df*: Difference in number of degrees of freedom between models. *All models are compared with their respective unconstrained model.*
$\Delta\chi^2$: Difference in χ^2 values between models. *All models are compared with their respective unconstrained model.*

Figure 4.9: Standardised Estimates for the Unconstrained Models across the Three Groups



The second hypothesis that *quantitative overload and hostile environment (external and internal hostility) are associated with staff job satisfaction, and intention to leave jobs* is supported. Goodness-of-fit measures show that this association occurs across the three groups of team structure however there is factorial and structural non-equivalence across the three groups. However, there is structural invariance in the work-stressor-strain path between those on no team and those in pseudo team.

Table 4.12 shows the models' total effects, standardised effects and squared multiple correlations, with noticeable differences between the three groups.

Table 4.12
Total Effects, Standardised total effects, and squared multiple correlations

	Samples	Job Design	Social Support	Quantitative Overload	Hostility	Job Satisfaction	Staff Intention to Leave Job
Total Effects	**No team**	.710	.397	1.000	.847	-1.364	1.840
	Pseudo team	.749	.338	1.000	.964	-1.048	1.481
	Real team	.820	.359	1.000	.832	-.914	1.587
	Total	.766	.372	1.000	.847	-1.364	1.840
Standardised Total Effects	**No team**	.945	.900	.560	.497	-.600	.667
	Pseudo team	.985	.837	.602	.588	-.519	.586
	Real team	.964	.820	.592	.521	-.476	.584
	Total	.972	.856	.560	.497	-.600	.667
Squared Multiple Correlations	**No team**	.894	.810	.314	.247	.576	.712
	Pseudo team	.969	.700	.362	.346	.568	.724
	Real team	.930	.673	.350	.272	.497	.749
	Total	.945	.733	.314	.247	.576	.712

4.10.3 Moderated Multiple Regression Analysis

The moderated hypotheses were tested using hierarchical regression analysis. The procedure recommended by Aiken and West (1991) was adopted.

4.10.3.1 Social support as moderator of the work stressor to strain relationships

Tables 4.13 (p. 159) and 4.14 (p. 160) show the results of the regression analysis of social support as moderator. Quantitative overload and hostility are the independent variables, whereas job satisfaction and staff intention to leave job are the dependent variables for those in no team, pseudo team and real team. After controlling for demographic variables, the results of the second step show that quantitative overload and social support together predicted a significant portion of the variance in job satisfaction (R^2 = .407 to .495, p< .001) and staff intention to leave job (R^2 = .152 to .198, p< .001).

Similarly hostility and social support predicted a significant portion of the variance for job satisfaction (R^2 = .413 to .500, p< .001) and staff intention to leave job (R^2 = .156 to .197, p< .001). The explained variance in step 2 is consistently higher for those that do not work in teams.

To test whether the moderator hypothesis is valid, the two-way interaction terms were entered in step 3 in both Tables. The interaction terms were significant for Table 4.13. This yielded a small ΔR^2 of .1 to .4% (p< .001) for job satisfaction and .1 % for staff intention to leave job.

Due to the large sample sizes, even very small effects become statistically significant. For hostility, the interaction terms were only significant for pseudo team and real team with job satisfaction as outcome variable. Therefore, the third group of hypotheses are only partially supported, despite the fact that after obtaining statistically significant two-way interactions, the changes in R^2 which are essential to claim practical significance were minimal.

Table 4.13
Summary of Moderated Regression Analysis - Quantitative Overload as Independent Variable and Social Support as Moderator, Predicting Job Satisfaction and Intention to Leave Job.

Step	Variable	Team Structure	Job satisfaction			Staff intention to leave job		
			B	SE B	β	B	SE B	β
1	Age	No team	.021	.010	.025	-.171	.013	-.154*
		Pseudo Team	-.003	.005	-.003	-.165	.007	-.144*
		Real Team	.005	.005	.006	-.146	.007	-.139*
	Gender	No team	.054	.010	.061*	-.083	.014	-.070*
		Pseudo Team	.037	.005	.046*	-.042	.007	-.038*
		Real Team	.005	.005	.031*	-..24	.007	-.024*
	Occupational group	No team	.056	.010	.068*	-.021	.013	-.019
		Pseudo Team	.008	.005	.010	-.011	.007	-.010
		Real Team	.005	.005	.043*	.007	.008	.006
	ΔR^2	No team	.008*			.028*		
		Pseudo Team	.002*			.022*		
		Real Team	.003*			.020*		
2	Quantitative overload	No team	-.074	.007	-.085*	.165	.012	.142*
		Pseudo Team	-.063	.004	-.078*	.125	.007	.110*
		Real Team	-.058	.004	-.081*	.122	.007	.118*
	Social support	No team	.581	.007	.695*	.460	.011	-.412*
		Pseudo Team	.557	.004	.683*	-.459	.007	-.403*
		Real Team	.508	.004	.626*	-.423	.008	-.360*
	ΔR^2	No team	.495*			.198*		
		Pseudo Team	.476*			.180*		
		Real Team	.407*			.152*		
3	Quantitative overload x Social support	No team	.027	.007	.036*	-.030	.011	-.030**
		Pseudo Team	.026	.004	.035*	-.028	.006	-.027*
		Real Team	.046	.004	.065*	-.034	.007	-.033*
	ΔR^2	No team	.001*			.001*		
		Pseudo Team	.001*			.001*		
		Real Team	.004*			.001*		
	F Change	No team	16.527*			7.382*		
		Pseudo Team	54.083*			20.379*		
		Real Team	133.791*			23.481*		
	Total R^2	No team	.505			.227		
		Pseudo Team	.479			.203		
		Real Team	.413			.172		

$^{*}p < .001$, two-tailed. $^{**}p < .01$, two-tailed.

Table 4.14

Summary of Moderated Regression Analysis - Hostility as Independent Variable and Social Support as Moderator, Predicting Job Satisfaction and Intention to Leave Job.

Step	Variable	Team Structure	Job Satisfaction			Staff Intention to Leave Job		
			B	SE B	β	B	SE B	β
1	Age	No team	.020	.010	.024	-.170	.013	-.154*
		Pseudo Team	-.002	.005	-.003	-.165	.007	-.144*
		Real Team	.004	.005	.006	-.146	.007	-.1398
	Gender	No team	.055	.010	.062*	-.083	.014	-.070*
		Pseudo Team	.037	.005	.046*	-.041	.007	-.037*
		Real Team	.022	.005	.032*	-.024	.007	-.024*
	Occupational group	No team	.058	.010	.071*	-.021	.013	-.019
		Pseudo Team	.009	.005	.011	-.012	.007	-.010
		Real Team	.032	.005	.043*	.007	.008	.006
	ΔR^2	No team		.009*			.028*	
		Pseudo Team		.002*			.022*	
		Real Team		.003*			.020*	
2	Hostility	No team	-.110	.008	-.121*	.173	.013	.143*
		Pseudo Team	-.089	.004	-.119*	.149	.006	.143*
		Real Team	-.091	.004	-.118*	.152	.008	.136*
	Social support	No team	.563	.007	.673*	-.437	.012	-.392*
		Pseudo Team	.546	.004	.667*	-.439	.007	-.386*
		Real Team	.501	.004	.618*	-.416	.008	-.355*
	ΔR^2	No team		.500*			.197*	
		Pseudo Team		.483*			.187*	
		Real Team		.413*			.156*	
3	Hostility x Social support	No team	-.002	.007	-.003	-.007	.012	-.007
		Pseudo Team	.010	.003	.015**	.004	.006	.004
		Real Team	.016	.004	.020*	-.009	.008	-.008
	ΔR^2	No team		.000			.000	
		Pseudo Team		.000**			.000	
		Real Team		.000*			.000	
	F Change	No team		.082			.370	
		Pseudo Team		8.746			.462	
		Real Team		13.467*			1.513	
	Total R^2	No team		.509			.225	
		Pseudo Team		.486			.209	
		Real Team		.416			.176	

$^{*}p < .001$, two-tailed. $^{**}p < .01$, two-tailed.

4.10.3.2 Job Design as Moderator of the Work Stressor-to-Strain Relationships

Tables 4.15 and 4.16 show the results of the regression analysis of job design as moderator. After controlling for demographic variables, quantitative overload and job design together predicted a significant portion of the variance in job satisfaction (R^2 = .374 to .410, p< .001) and staff intention to leave job (R^2 = .161 to .199, p< .001).

The explained variance in step 2 is consistently higher for those that do not work in teams. Similarly, hostility and job design predicted a significant portion of the variance for job satisfaction (R^2 = .382 to .425, p< .001) and staff intention to leave job (R^2 = .163 to .202, p< .001). To test whether the moderator hypothesis is valid, the two-way interaction terms were entered in step 3 in both Tables.

Although all the interaction terms were significant for both dependent variables, the effect sizes are very small ranging from .1 to .2% (p< .001) increase in explained variance. Therefore, there is minor support for the fourth group of hypotheses, even in the case where there is statistical significance; the change in R^2, essential for practical significance, is very small.

Table 4.15
Summary of Moderated Regression Analysis - Quantitative Overload as Independent Variable and Job Design as Moderator, Predicting Job Satisfaction and Intention to Leave Job.

Step	Variable	Team Structure	Job Satisfaction			Staff Intention to Leave Job		
			B	SE B	β	B	SE B	β
1	Age	No team	.020	.010	.024	-.171	.003	-.154*
		Pseudo Team	-.003	.005	-.003	-.165	.007	-.144*
		Real Team	.005	.005	.007	-.146	.007	-.139*
	Gender	No team	.053	.010	.060*	-.082	.014	-.070*
		Pseudo Team	.036	.005	.045*	-.041	.007	-.037*
		Real Team	.022	.005	.031*	-.024	.007	-.024*
	Occupational group	No team	.055	.010	.066*	-.022	.013	-.020
		Pseudo Team	.007	.005	.009	-.011	.007	.010
		Real Team	.032	.005	.043*	.007	.008	.006
	ΔR^2	No team		.008*			.029*	
		Pseudo Team		.002*			.022*	
		Real Team		.003*			.020*	
2	Quantitative overload	No team	-.083	.008	-.095*	.169	.012	.145*
		Pseudo Team	-.072	.004	-.088*	.128	.007	.112*
		Real Team	-.073	.004	-.103	.132	.007	.128*
	Job design	No team	.527	.007	.627*	-.463	.012	-.413*
		Pseudo Team	.524	.004	.631*	-.480	.007	-.416*
		Real Team	.495	.005	.596*	.444	.008	-.371*
	ΔR^2	No team		.408*			.199*	
		Pseudo Team		.410*			.190*	
		Real Team		.374*			.161*	
3	Quantitative overload x Job design	No team	.026	.007	.034*	-.031	.011	-.029**
		Pseudo Team	.017	.004	.023*	-.029	.006	-.027*
		Real Team	.037	.004	.052*	-.037	.007	-.036*
	ΔR^2	No team		.001*			.001**	
		Pseudo Team		.000*			.001*	
		Real Team		.002*			.001*	
	F Change	No team		13.093			7.360	
		Pseudo Team		20.623			21.257	
		Real Team		75.556			27.446	
	Total R^2	No team		.417			.229	
		Pseudo Team		.413			.213	
		Real Team		.379			.182	

$^{*}p < .001$, two-tailed. $^{**}p < .01$, two-tailed.

Table 4.16

Summary of Moderated Regression Analysis - Hostility as Independent Variable and Job Design as Moderator, Predicting Job Satisfaction and Intention to Leave Job.

Step	Variable	Team Structure	Job satisfaction			Staff intention to leave job		
			B	SE B	β	B	SE B	β
1	Age	No team	.019	.010	.023	-.171	.013	-.154*
		Pseudo Team	-.002	.005	-.003	-.165	.007	-.144*
		Real Team	.004	.005	.006	-.146	.007	-.139*
	Gender	No team	.054	.010	.061*	-.082	.014	-.070*
		Pseudo Team	.036	.005	.046*	-.041	.007	-.037*
		Real Team	.022	.005	.032*	-.024	.007	-.024*
	Occupational Group	No team	.057	.010	.069*	-.022	.013	-.020
		Pseudo Team	.009	.005	.011	-.012	.007	-.010
		Real Team	.032	.005	.043*	.007	.008	.006
	ΔR^2	No team		.008*			.028*	
		Pseudo Team		.002			.022*	
		Real Team		.003*			.020*	
2	Hostility	No team	-.149	.008	-.164*	.193	.013	.160*
		Pseudo Team	-.109	.004	-.145*	.156	.006	.150*
		Real Team	-.099	.004	-.127*	.155	.007	.138*
	Job design	No team	.507	.007	.604*	-.443	.012	-.395*
		Pseudo Team	.510	.004	.614*	-.461	.007	-.399*
		Real Team	.488	.005	.590*	.434	.008	-.363*
	ΔR^2	No team		.425*			.202*	
		Pseudo Team		.422*			.197*	
		Real Team		.382*			.163*	
3	Hostility x Job design	No team	.004	.008	.005	-.044	.013	-.039*
		Pseudo Team	.015	.004	.023*	-.003	.006	-.004
		Real Team	.019	.005	.023*	-.019	.008	-.016**
	ΔR^2	No team		.000			.001*	
		Pseudo Team		.000*			.000	
		Real Team		.001*			.000**	
	F Change	No team		.280			12.087	
		Pseudo Team		16.620			.327	
		Real Team		16.273			5.624	
	Total R^2	No team		.433			.232	
		Pseudo Team		.424			.220	
		Real Team		.385			.183	

$^{*}p < .001$, two-tailed. $^{**}p < .01$, two-tailed.

4.11 Discussion

Study one investigated a proposed model that social support and job design, which are predicted by quality of senior management leadership, moderate work stressor to strain relationships across three levels of team structure. Through structural equation modelling, the models which depicted the hypothesised relationships achieved good model fit statistics across team structure. Senior management leadership explained 73% and 95% of the variance of social support and job design respectively, whereas work stressors explained 51% of the variance of strains.

Using multi-group structural equation modelling, the results confirmed the model's robustness across the three groups of team structure. However, factorial and structural non-equivalence between the three groups confirmed that differences do exist between the groups. The exception is the structural invariance in the work-stressor-strain path between those on no team and those in pseudo team.

Using multivariate analysis of variance, statistically significant differences between means across the three groups of team structure, with mostly moderate effect sizes, were found for the study variables. An interesting finding was that those working in pseudo teams appeared to have higher levels of strain than those not working in teams. Furthermore, those in real teams had the highest levels of job satisfaction and the least intention to leave job. This study is therefore a revelation for team-friendly organisations to work towards achieving real teams, rather than just any team, as pseudo teams fared worse than those in no team.

Regression analysis provided major support for main effects, namely with job satisfaction and intention to leave jobs regressed on the moderator variables and the work stressors. These results showed that both social support and job design were important predictors of job satisfaction and staff intention to leave job. However, this study provided minor support for the moderation hypotheses. Although the interaction terms *Quantitative Overload x Social Support* and *Quantitative Overload x Job Design* were statistically significant across team structure, mostly due to the large sample size, the change in R^2 was minimal ranging from .1% to .4%. With regard to *Hostility x Social Support* and *Hostility x Job Design*, the interaction terms were statistically significant for real teams and pseudo teams only. The change in R^2 was also minimal ranging from .1% to .2%. The results for moderation hypotheses are unsatisfactory and may be due to the limitations discussed hereunder.

This study has several limitations. First the major limitation of this study was that I had to do secondary analysis of a data set, which was collected for other purposes, and therefore, I had no control on the research design and methodology. For example, the lack of discriminant validity between QSML and SS/JD might be due to response bias where participants failed to differentiate between questions referring to senior management from those referring to supervisors. Although the scales used were psychometrically validated and achieved good internal reliability, the conceptual framework is not identical to the one used for study two, simply because not all the variables of study two were measured in the NHS data set.

Secondly, the cross-sectional nature of the data does not allow drawing any conclusions in terms of causality. It would be worth examining longitudinal data that were collected in the subsequent NHS surveys.

Thirdly, the use of self-report data highlights the problem of percept-percept bias (Crampton & Wagner, 1994), which is specifically associated with single source data collection. Unfortunately, I had no control on the research design of study one, which was only intended as a pilot study to test the buffering hypothesis of the stressor-strain relationship, the latter being the major hypothesised relationship of study two. Therefore, study one was somewhat exploratory in nature with the intention of conducting study two as an absolutely necessary additional research. Several studies have attempted to evaluate the extent to which common method variance inflates the relationships among constructs. While Spector (1987) defended the position that self-report methodology still provides meaningful relationships, Doty and Glick (1998) emphasised that common method variance does in fact result in percept-percept bias. Midway between these apparently paradoxical conclusions, Crampton and Wagner (1994) argued that this bias is domain specific and identified job satisfaction, turnover intentions, and role characteristics as being among those particularly susceptible to inflationary effects. Unfortunately, these were among the perceptual measures in study one, and were collected from the same NHS employees when completing the same survey at one point in time. Without objective measures, participants could have provided inaccurate or socially acceptable responses. Indeed, the fact that the results of study one show several highly correlated variables may be partly explained by this artefact.

However there were several steps (Maurer, Weiss, & Barbeite 2003) that could be identified and which could have somewhat alleviated the problem. The questionnaires could be completed in privacy and full confidentiality was ensured, thereby reducing the motive to answer favourably in a manner to please the employer. Furthermore, the questionnaire had a variety of response scales or anchors, which according to Doty and Glick (1998) is a useful tactic to minimise bias.

The lack of discriminatory validity appears to be greater for hypothesised relationship between QSML and SS/JD. Therefore, to explore the extent to which common source bias was present in this relationship, Harman's one factor test (Podsakoff et al., 2003) was used. I entered all the scales used in the study for this relationship to determine whether a single factor explained most of the variance among the three constructs. The main factor explained only 31.4% of the variance. This method, however, has its limitations as it does not control for common method variance, and the likelihood of obtaining more than one factor increases, thus rendering the procedure less sensitive with increase in the number of variables.

Moreover, I endeavoured first through exploratory and then through confirmatory factor analysis on randomly selected halves of the data set respectively, to achieve construct validity (Campbell & O'Connell, 1982). Indeed, the models achieved reasonably good fit indices. In addition, every attempt was made to avoid overlap of content amongst the variables under study. For example, there was close proximity in the items on clarity of objectives/goals in the original measures on team structure, social support and job design in the questionnaire. Therefore, I reran the analysis with the items on clarity eliminated from the scales on social support and job design, to avoid having structural invariance, in the multigroup structural equation modelling, a likely function of similarity of content in the measures. To further alleviate the problem of common method variance, temporal spacing of measures should be employed in future studies by gathering responses on explanatory variables at separate times from responses on the dependent variables.

Fourthly, this study adopted an individual level of analysis. Consequently, although some of the variables, such as leadership, social support, and team structure would have some degree of shared variance, this was not captured in this study. Additionally, by using the traditional statistical techniques, I may have violated two assumptions, namely, independence of observations as a result of the shared environment, and homoscedasticity, which assumes that the variance of the residual errors are independent from the values of the explanatory variable (Hox, 2002).

Therefore, by failing to take into account the shared variance, the ordinary multiple regressions may not have worked well. Indeed, Bliese and Hanges (2004) argued that unaccounted-for non-independence can be problematic because it affects standard error estimates used to determine statistical significance. Hence, the fact that organizational data are inherently nested, with the lower level data being typically influenced by higher level grouping factors, calls for the adoption of multilevel techniques.

Finally, the strength of this study lies in the huge sample size of 65,142 respondents from 172 acute/specialist British NHS trusts, which is neither common nor easy to achieve. However, the downside of this is that with such a sample size, nearly all relationships tested achieved statistical significance, with the conclusion that p value has minimal value.

For this reason, I have worked out effect sizes to gauge the magnitude of the relationships with mixed results. Indeed, the moderated regression analysis results show statistical significance at $p < .001$, even with minimal R^2 changes that have no practical significance at all.

4.12 Chapter Summary

In this chapter, I presented study one as a first attempt which is to say as a pilot study to investigate the moderated stressor-to-strain relationships. The investigation was carried out on a random sample of health care employees working in acute hospital practice. The sample comprised 65,142 respondents from 172 acute/specialist NHS trusts. The work stressors tested were quantitative overload and hostile environment whereas strains were measured through job satisfaction, and intention to leave job.

This study provided several results that have theoretical and practical implications. Importantly enough, it explained major variances in the main effects of work stressors with strains, as well as moderators with strains. However, it failed to provide a clear understanding of the moderator hypothesis of the stressor-strain relationship.

In conclusion, each study provided unique theoretical, methodological, and analytical perspectives with implications for research, management and practice. However, for study one, despite the large sample size, this data set, which was intended for other purposes, partially satisfied my needs to test the moderated stressor-strain relationships intended for this thesis. The understanding and analysis of major limitations of this study enabled me to set the stage and conditions for the main study of this thesis, namely study two, which I will present in the next chapters.

CHAPTER FIVE

STUDY TWO

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

5.1 Introduction to Study Two

In the following chapters, I will focus mainly on study two, which is also carried out in a hospital context. Although similar conceptually to study one, in terms of the buffering hypotheses of the stressor-to-strain relationships, study two is characterised by unique theoretical and methodological perspectives, as well as multilevel analytic strategy with the aim of answering the following research questions:

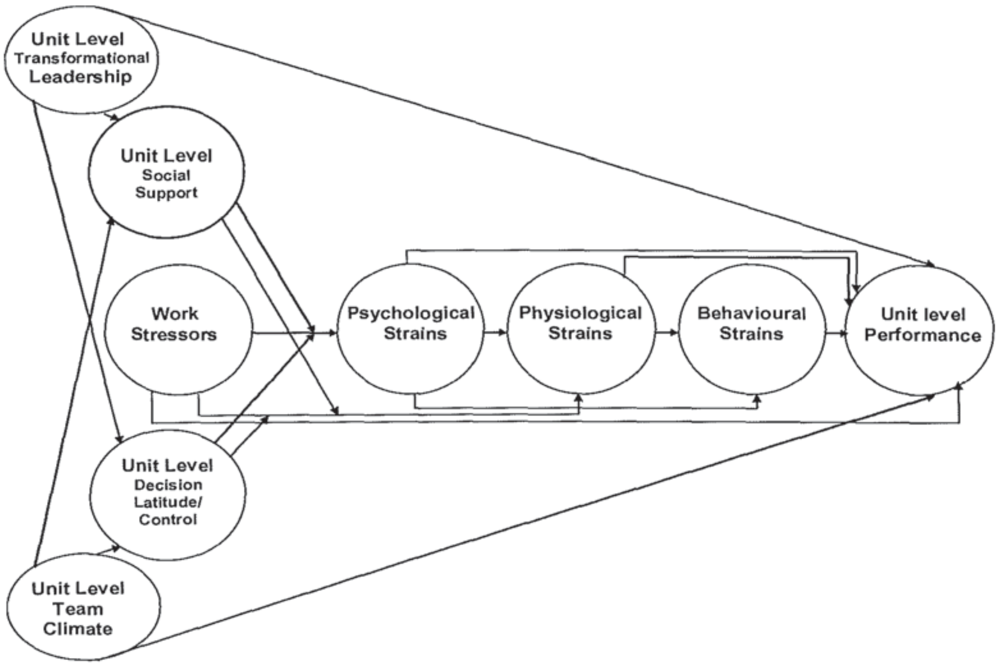
1. *To what extent and in what ways are work stressor-to-strain relationships associated with externally-rated unit-level performance in hospital practice?*
2. *To what extent are unit-levels of transformational leadership and team climate associated with unit-level climate for social support and decision latitude/control across hospital units?*
3. *To what extent and in what ways can unit-level climate for social support and decision latitude/control buffer work stressor-to-strain relationships?*
4. *Are unit-level measures of shared transformational leadership and team climate associated with externally-rated unit-level performance in hospital practice?*

The rationale for multilevel models is threefold: first, to examine the group level effects of shared transformational leadership, team climate, social support, and decision latitude/control; second, to examine that the mediated and moderated relationships of the work-stressor-to-strain relationships; and finally third, to relate these relationships to the externally-rated unit-level performance. This variability would be undetected in the traditional linear regression analysis. This chapter provides a discussion of both the theoretical framework underlying study two and also the rationale for hypotheses development.

5.2 Theoretical Framework of Study Two

The proposed framework of hypothesised relationships in study two (Figure 5.1) is a hierarchical one that is modelled on the hospital unit-level predictors (shared leadership and team climate); hospital unit-level climate by the moderators (social support, and decision latitude/control); individual-level variables (hospital-unit members' work stressors and strains); and externally-rated unit-level outcome (performance).

Figure 5.1: Illustration of Hypothesised Relationships in Study Two



Several authors argue that although traditional work stress models are largely individually focused, the incorporation of a multilevel perspective is justified to acknowledge the impact of group-level, shared work environments on the group-member-level stressor-to-strain relationships (Bliese & Jex, 1999, 2002; Koslowsky, 1998).

5.3 Hypotheses Development

I will work through the hypotheses based on the literature review as critiqued in chapters two and three. The theoretical framework that will emerge is an example of multilevel random coefficient models. Variables may be analysed at more than one level, hence multilevel analysis (Raudenbush & Bryk, 2002). One should distinguish between latent/unobserved variables (constructs in the framework) and manifest/observed variables (the items in the research instruments).

Indeed, through path models and structural models, relationships between latent and manifest variables may be hypothesised (Chan, 2002). The framework, which evolves into a series of path models with specific linkages, involves a hierarchical data structure, where the units of analyses are both hospital unit employees, as well as the secondary health care units/teams.

The theoretical framework illustrated in Figure 5.1 includes the principal stressor-to-strain relationships, which fit within *hierarchical linear modelling* (HLM), and aimed at finding a *linear* model for the dependent variables (strain) based on the independent variables (work stressors), but factoring in non-independence of observations due to clustering in units. Additionally, it includes the main effects of transformational leadership/team climate on social support/decision latitude-control.

Multilevel random coefficient models are well suited to test cross-level interaction hypotheses. In so doing, one allows the slope between stressors and strain to vary across groups. One may possibly hypothesise a three-way interaction, since the decision latitude/control moderates the relationship between work demands and burnout, and this moderating relationship is found only when social support is high.

However, a three-way interaction is difficult to test and relies on a large sample size (Curran, Bauer, & Willoughby, 2004).

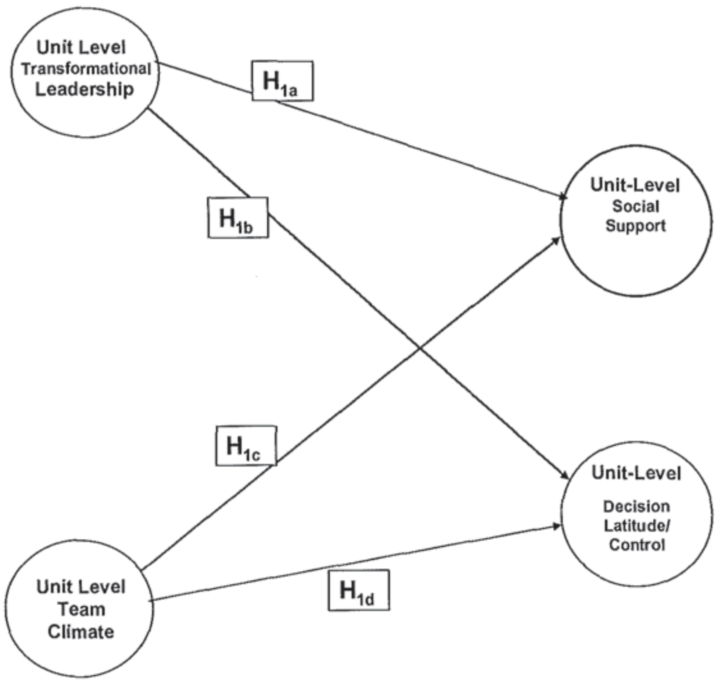
Furthermore, the part of the theoretical framework that includes hospital unit performance as a higher-level outcome violates the assumptions of HLM. Indeed, the relationships that include hospital unit performance will be analysed by means of multilevel modelling programme Mplus® and multilevel structural equation modelling.

The theoretical framework provides the background to the following four groups of specific testable hypotheses and aims at answering the research questions.

Hypotheses Group One: Unit-Levels of Transformational Leadership and Team Climate, Are Positively Related to Unit-Level Climate for Social Support and Decision Latitude/Control across Hospital Units.

This first group of hypotheses (Figure 5.2, overleaf) deals with the association between transformational leadership and team climate at unit level, and unit-level climate for social support and decision latitude/control. These hypothesised relationships characterise the social environment within the hospital units that may influence the work stressor-to-strain relationships as perceived by the hospital employees. Therefore, for hypotheses group one, the analyses of the hypothesised relationships will not cross levels.

Figure 5.2: Illustration of Hypotheses Group One in Conceptual Framework



Transformational leadership is a function of five dimensions, namely, vision, inspirational communication, intellectual stimulation, supportive leadership, and personal recognition (Rafferty & Griffin, 2004). Team climate measured by means of Team Climate Inventory (Anderson & West, 1998) is a function of four dimensions namely, team members' participation, support for new ideas, clarity of objectives, and team task orientation. Therefore,

As study two is a cross-sectional study, the direction of the hypothesised relationships cannot be tested. However, these relationships and proposed directions are primarily based on massive literature that links leaders with their followers, and secondly, on theoretical and empirical evidence that team climate influences team members.

Hypothesis 1a:

Unit-level transformational leadership is positively related to the unit-level climate for total social support.

Hypothesis 1b:

Unit-level transformational leadership is positively related to the unit-level climate for decision latitude/control.

Hypothesis 1c:

Unit-level team climate is positively related to the unit-level climate for total social support.

Hypothesis 1d:

Unit-level team climate is positively related to the unit-level climate for decision latitude/control.

Furthermore, the next two hypotheses deal with the way in which unit-level transformational leadership in conjunction with team climate predict unit-level climate for social support and decision latitude/control.

Hypothesis 1e (*Not indicated in the illustration Figure 5.2*):

Unit-level transformational leadership and team climate are positively related to the unit-level climate for total social support.

Hypothesis 1f: (*Not indicated in the illustration Figure 5.2*):

Unit-level transformational leadership and team climate are positively related to the unit-level climate for decision latitude/control.

Hypothesis 2: Hospital Employees' Work Stressor-to-Strain Relationships Are Associated with Externally-Rated Unit-Level Measure of Performance

This group of hypotheses deals with relationships between various work stressors to which hospital employees are exposed, and the psychological, physiological and behavioural strains as illustrated in Figure 5.3. Additionally, this group also deals with the hypothesised links between these unit members' work stressor-strain relationships and the performance of their units.

The work stressors in study two include the nature of one's work (physical and psychological work demands, and quantitative and qualitative workload), organisational constraints at work, incidents at work, and proposed move to a new hospital (organisational change). Work stressors and strains are measured using the survey approach and are intended at level one of the multilevel analysis.

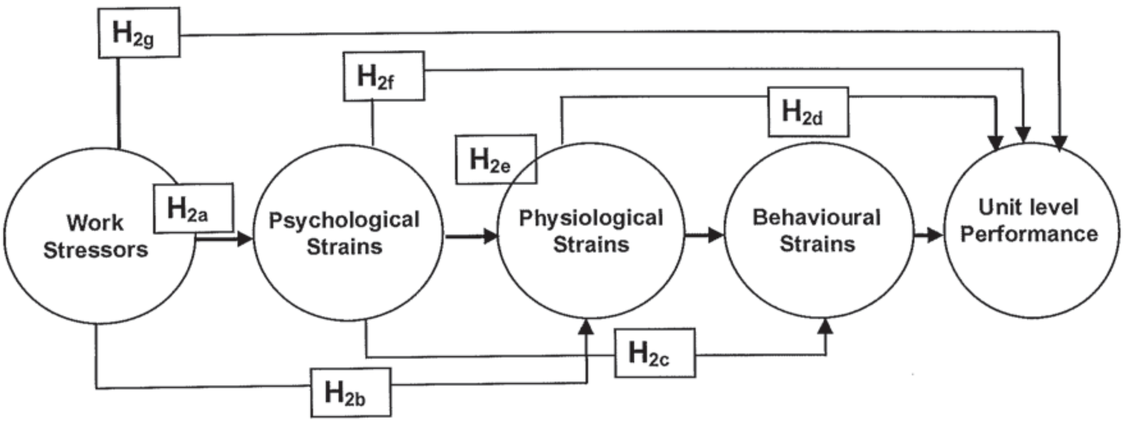
This study includes measures of psychological strains, more specifically, job satisfaction, intention to leave job, emotional exhaustion, depersonalisation, and reduced personal accomplishment; physiological strains; and finally, an objective measure of behavioural strain by means of absenteeism obtained from the Human Resources Department.

The interactional theories of stress: the demand-control/support model (Johnson, 1989; Karasek, 1979; Karasek & Theorell, 1990; Karasek et al., 1998) and the Leiter and Maslach's sequential model of burnout (Maslach, 1982; Leiter & Maslach, 1988) -- provide the underpinning of the stressor-strain link in this study. There is ample empirical research that links Karasek's DC/S model with psychological and physiological strain (Karasek & Theorell, 1990). Additionally, based on theoretical and empirical evidence, it is proposed that those with higher levels of psychological strain will perceive higher levels of physical symptoms (Pikó, 1999; Schaufeli &

Bakker, 2004) resulting in a greater tendency to resort to sickness absence. Furthermore, there are theoretical explanations for the link between psychological strain and absenteeism. Horney (1950) theorized that individuals resort to resignation solutions when faced with anxiety at work, in that they withdraw from others and become isolated. These will eventually resort to sick leave as a resolution strategy (Bekker, Croon, & Bressers, 2005; Van Der Doef, Maes, & Diekstra, 2000), or they slip down in their performance with the consequence of diminishing unit performance.

Study two, presented in this thesis, is a cross-sectional study, which cannot claim direction of causality. However, Karasek's massive body of literature strongly supports the direction in the relationships between stressors and strains. Figure 5.3 illustrates the second group of hypotheses.

Figure 5.3: Illustration of Hypotheses Group Two in Conceptual Framework



Hypothesis 2a:

Hospital employees' work stressors are positively associated with their psychological and physiological strains.

Hypothesis 2b:

Hospital employees' work stressors are positively associated with their physiological strains through the mediating effects of their psychological strains.

Hypothesis 2c:

Hospital employees' psychological strains are positively associated with their behavioural strains through the mediating effects of their physiological strains.

Hypothesis 2d:

Hospital employees' physiological strains are positively associated with externally-rated unit-level performance through the mediating effects of their behavioural strains.

Hypothesis 2e:

Hospital employees' psychological strains are positively associated with externally-rated unit-level performance through the mediating effects of their physiological strains.

Hypothesis 2f:

Hospital employees' work stressors are positively associated with externally-rated unit-level performance through the mediating effects of their psychological strains.

Therefore, unit member psychological, physiological, and behavioural strains are mediators representing the generative mechanism (Baron & Kenny, 1986) through which work stressors are able to influence externally-rated unit-level performance, separately or together.

Hypothesis 2g:

Hospital employees' work stressors are positively associated with externally-rated unit-level performance through the mediating effects of their psychological, physiological, and behavioural strains.

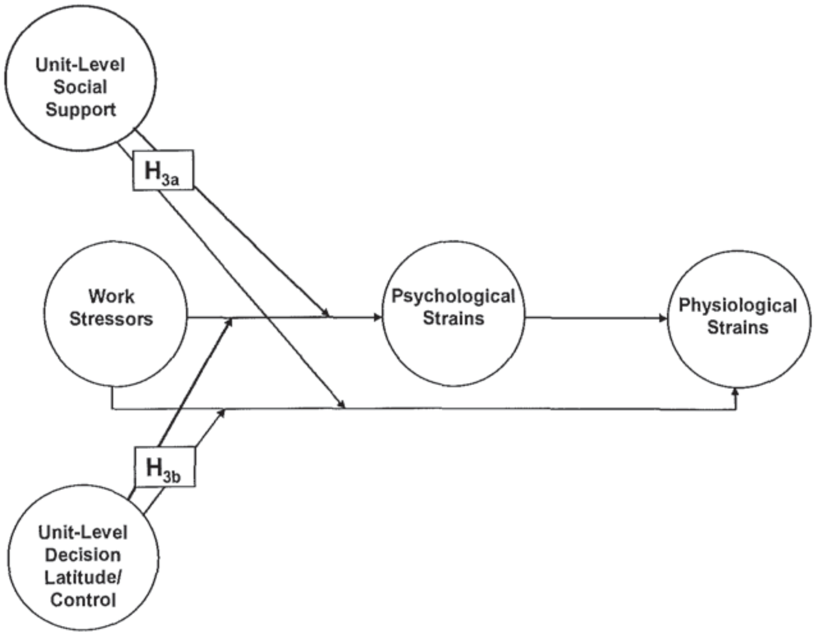
Hypothesis 3: Social Support and Decision Latitude/Control as Moderators of the Work Stressor-to-Strain Relationships

There is no comprehensive theory that fully explains the moderator model in the stressor-strain link (Dollard, 2002). It is clear that the theoretical underpinning as proposed in this study is an eclectic one whose aim is to provide an integrated framework. This draws on distinct theories and models to create a better understanding of the different components in the conceptual stressor-strain link. The theoretical link with social support and decision latitude /control is explained in Karasek's Demand Control/Support model (1979, 1990). Additionally, the theoretical bases of social support as a moderator are the social support theory (Cooper, Dewe, & O'Driscoll, 2001; Quick, Quick, Nelson, & Hurrell, 1997) and the social influence theory (Van Avermaet, 2001). The social support theory explains that social support alters the cognitive judgement of the stressor by buffering the individual from health damaging psychological processes. The social influence theory explains a change in judgements because of group dynamics.

In line with House's (1981) identification of types of support, both supervisor and co-worker support provide instrumental, emotional, informational, and appraisal support. Social support, provided by supervisors and co-workers, will moderate work stressors and strains (Figure 5.4).

Specific to this study, I am interested in analysing the individual stressor-to-strain relationships that exist within a climate for social support and a climate for decision latitude/control, and how these unit-level effects impact individuals. Moreover, the intriguing part of the analysis is to find out how the individual differences in stressor-to-strain relationships impact the external ratings of their unit, which forms part of hypotheses group two.

Figure 5.4: Illustration of Hypotheses Group Three in Conceptual Framework



The testable hypotheses will first include the composite scores before focusing in detail on specific work stressors and strains. Hypotheses 3a and 3b incorporate a number of testable relationships involving work stressors, strains, and moderator variables. The work stressors under study are the composite scores of *work stressors* and of *nature of work*, as well as the specific work stressors namely psychological demands, physiological demands, quantitative workload, qualitative workload, organisational constraints, interpersonal conflict, incidents at work, and organisational change generated from the proposed move to the new hospital site.

The psychological strains tested include composite scores for psychological strain and burnout, as well as specific constructs, namely, job (dis)satisfaction, intention to leave job, emotional exhaustion, depersonalisation, and (reduced) personal accomplishment.

The physiological strains are measured through the physical symptoms inventory (Spector & Jex, 1998).

The moderator variables under study are total social support, which includes both supervisor and co-worker support; supervisor support and co-worker support separately; and decision latitude/control.

> **Hypothesis 3a:**
>
> Social support will moderate the relationships between work stressors and psychological/physiological strains, so that higher levels of social support will minimise (buffer) these relationships.

Therefore, perceived work stressors will be positively related to psychological/physiological strains in the presence of low social support. In contrast, higher levels of social support by supervisors and co-workers will 'buffer' the relationships between perceived work stressors and diminish psychological/physiological strains. Moreover, in line with the demand control/support model, decision latitude/control will also moderate the relationships between work stressors and strains.

> **Hypothesis 3b:**
>
> Decision latitude/control will moderate the relationships between work stressors and psychological/physiological strains, so that higher levels of decision latitude/control will minimise (buffer) these relationships.

As for social support, the work stressors and psychological strains that were tested included both composite scores, as well as specific constructs. Therefore, perceived work stressors will be positively related to psychological/physiological strains in the presence of low decision latitude/control. In contrast, higher levels of decision latitude/control will 'buffer' the relationships between perceived work stressors and psychological/physiological strains.

Furthermore, this group of hypotheses will also deal with three-way interactions between work stressors, social support, and decision latitude/control. This leads me to hypothesis 3c.

Hypothesis 3c (***Not indicated in the illustration Figure 5.4)*****:**

When decision latitude/control is high, higher levels of social support will 'buffer' the negative relationships between work stressors and strains. On the other hand, when decision latitude/control is low, the buffering effects of social support will be minimised.

Therefore, a series of three-way interactions were tested involving work stressors (composite and specific work stressors) x social support (total social support, as well as specifically supervisor support, and co-worker support) x decision latitude/control. The results will be presented in chapter eight.

Hypothesis 4: The Relationship between Unit-level Measures of Transformational Leadership and Team Climate, and Externally-Rated Unit-level Performance in Hospital Practice

Shared Leadership and team climate have both been associated with lower stress levels, and higher job satisfaction, well-being and individual performance (Borrill et al., 2001; Cooper, Dewe, & O'Driscoll, 2001; Prabhu & Robson, 2000; Walburg, 2006). However, transformational leadership and team climate have also been linked with unit-level performance (Bass, Avolio, Jung, & Berson, 2003; Özaralli, 2003) and team climate has been linked with lower patient mortality in hospitals (West et al., 2002).

This study aims to reaffirm the relationships of transformational leadership and team climate with unit-level performance. The variables transformational leadership, team climate, and unit performance are all intended at the higher-level, with the first two aggregated from individual-level perceptions, while the third measured directly at hospital unit-level.

Hypothesis 4a:

Unit-level measure of transformational leadership is positively associated with externally-rated unit-level performance in hospital practice.

Hypothesis 4b:

Unit-level measure of team climate is positively associated with externally-rated unit-level performance in hospital practice.

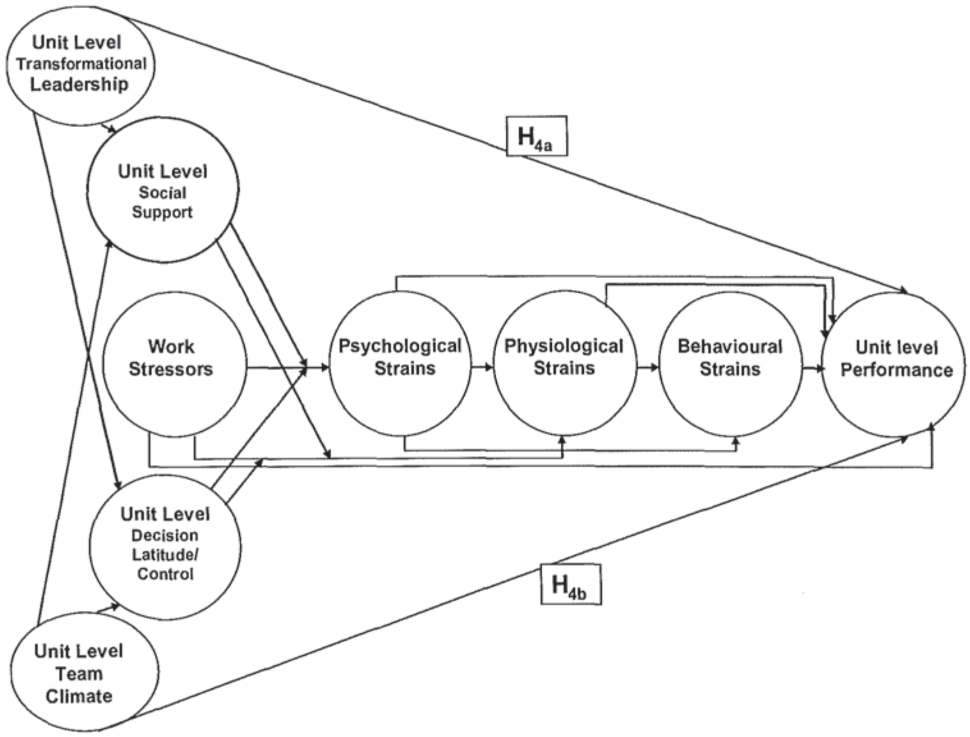
Furthermore, transformational leadership and team climate characterise a hospital unit's social environment. This leads me to the next hypothesis, which is the following:

Hypothesis 4c (*Not indicated in the illustration Figure 5.5*):

A positive social environment, characterised by higher levels of both unit-level measures of transformational leadership and team climate, is associated with higher externally-rated unit-level performance in hospital practice.

Figure 5.5 (overleaf) illustrates hypotheses 4a and 4b.

Figure 5.5: Illustration of Hypotheses Group Four in Conceptual Framework



5.4 Chapter Summary

This chapter focused on discussing the theoretical framework underlying study two, as well as the four groups of hypotheses. The model is therefore, focused primarily on the relationships work stressor-to-strain-to-unit performance, in hospital practice, and with examining the unit-level climate for social support and decision latitude/control as moderators of the work stressor-psychological/physiological strain link. Furthermore, unit-level transformational leadership and team climate are hypothesised to be associated with unit-level social support and decision latitude/control, across hospital units. The framework also includes the associations between unit-level transformational leadership/team climate and externally-rated unit-level performance, which are intended to be at the same level namely at the higher level of analysis.

Based on sound theoretical and empirical background, the direction of the relationships are most likely to be from work stressors to psychological strains to physiological strains and then to behavioural strains. However, since the study is cross-sectional in design, the hypothesised direction of causality cannot be tested.

Chapter five, which includes hypotheses development, forms the basis for the next chapters on study two. In chapter six, I will discuss the methodology adopted in this study, which includes the details of the preparation and implementation of data collection. In chapter seven, I will provide details of the psychometric validation of the instruments and of the multilevel data, as well as the analysis strategy to test the groups of hypotheses developed in this chapter.

CHAPTER SIX

STUDY TWO
METHODOLOGY

6.1 Chapter Overview

This study attempts to answer the primary research questions: First, to what extent and in what ways are work stressor-to-strain relationships associated with unit performance in hospital practice? Secondly, can the social environment and work practices in hospital units buffer health care professionals against these stressors?

Study two involves primary analyses of cross-sectional, multilevel, and multi-source data collected in Malta (Appendix 1 carries a description of the research setting), during the period September-November 2005. This chapter gives an overview of the various procedures involved in the research process and aims to provide the rationale for the chosen methodology.

Additionally, it outlines the research instruments utilised for data collection. At the same time, it provides a brief description of ongoing data collection intended for future research, while bearing in mind the limitations of the cross-sectional study and the challenges of its multilevel nature. The study proposes to test a number of hypothesised relationships in order to satisfy the following aims and objectives.

6.2 Aims

To answer the research questions, the study aims to identify:

- Relationships between unit level predictors: transformational leadership and team climate and average unit members' social support and decision latitude/control, across hospital units;

- Mediated relationships between work stressors and the three types of strains namely psychological, physiological, and behavioural strains;
- Social support and decision latitude control, as moderators of the work stressor-to-strain relationships;
- Mediated relationships between the three types of strains at the unit member level, and externally-rated unit-level performance;
- And finally, relationships between unit level predictors: shared unit-level transformational leadership and team climate, and externally-rated unit-level performance.

6.3 Objectives

To achieve these aims, the following objectives were set:

- To provide a strong theoretical background to the hypothesised relationships in the study;
- To provide empirical evidence from studies published in the literature so as to back up the integration of the hypothesised relationships within the conceptual framework;
- To adopt a multilevel perspective in the regression of social support and decision latitude/control on transformational leadership and team climate;
- To adopt a multilevel perspective in testing the hypothesised moderation of social support and decision latitude/control in the various work stressors-to-strains relationships under study, by testing for two-way and three-way interactions;

- To adopt a multilevel perspective in testing the hypothesised mediated relationships from hospital employees' work-stressors to externally-rated unit-level performance;
- To adopt a single level perspective in the standard regression of externally-rated unit-level performance. on unit-level transformational leadership and team climate, separately and in combination;
- To provide implications of the study for research, management and practice.

6.4 Underlying Philosophy, Research Design, and Research Methods

The underlying philosophy or research paradigm refers to the collection of beliefs that influence scientists on the choice of area of study, research design, and research methods including how to interpret results (Bryman, 2001). Research design, allied to different philosophical positions, refers to the overall structure of research that best enables the achievement of the research aims. Research methods refer to the practices and techniques used to collect, process and analyze data (Bowling, 2002).

Creswell (2003) focused on three frameworks for research design: quantitative, qualitative, and mixed methods approaches with their dominant underlying philosophies being positivism, social constructionism, and relativism, respectively.

The distinction between the quantitative and qualitative approaches has been repeatedly debated by researchers (Bryman, 2001; Creswell, 2003), due to the fundamental difference in aims, purposes, and procedures. Some contend that these approaches are opposing paradigms differing in their fundamental assumptions about the world (Hammersley, 1996).

This difference is mainly in terms of objectivity versus subjectivity and also the competing deductive approaches to research versus inductive ones (Fulop, Allen, Clarke & Black, 2002). Dachler (2000), for example, contended that subjectivity is an error in the quantitative methodology, but it still constitutes a fundamental research domain in the qualitative approach.

Study two is consistent with scientific literature on the subject areas involved, (namely the stressor-strain link, demand-control/support models, leadership, teamwork, and performance) in adopting a positivist approach and a quantitative methodology. This method has been followed in order to capture general trends and to be able to provide the basis for recommendations that are robust enough to inform policy.

Positivism refers to the *epistemological* dimension (the best way of inquiring into the nature of the world), and assumes that there is an objective truth (Creswell, 2003). It is the dominant philosophy underlying the *quantitative* scientific research approach, which is the oldest and the most acceptable to the management, social, and human scientist (Easterby-Smith et al., 2002). The quantitative approach assumes that phenomena are measurable using deductive principles, meaning that the researcher ascertains the extent to which testable hypotheses, derived usually from theory, are supported, or falsified by the research data (Fulop et al., 2002).

The researcher, who uses quantitative systematic techniques and scientific approach, is *nomothetic* (Burrell & Morgan, 1979; Bryman, 2001) in that s/he seeks general rules of behaviour, thoughts, or emotions, applicable to all members of large populations within specified situational parameters. Furthermore, the researcher is *parsimonious* in that s/he seeks to describe, explain, or predict using the simplest configuration and smallest number of variables necessary (Fulop et al., 2002).

The strength of the quantitative approach lies in its compliance with three guiding principles (Bowling, 2002) namely *validity* (an assessment of whether the study and instruments measure what they aim to measure), *reliability* (the reproducibility and consistency of the results), and *generalisibilty* (the ability to apply results to the population through statistical probability). Additionally, quantitative studies tend to be fast, economical and of convincing relevance to policy decisions (Easterby-Smith et al., 2002).

All this fits in with the *ontological* (nature of reality) philosophical assumption adopted, namely that of *realism* i.e. the belief that there is a real social world made up of real structures (Burrell & Morgan, 1979; Creswell, 2003). As the two concepts of validity and reliability are fundamental to organisational psychology research, the dominance of the positivist paradigm is evident in major publications.

Easterby-Smith et al. (2002) emphasised that the choice of the research design depends on a number of factors, more specifically, independence or involvement of the researcher, size of the sample, testing or generation of theory, experimental/fieldwork, and universal or local validity.

In this study which involved fieldwork, I maintained my independence as the researcher, and therefore I was particularly careful to make sure that what was being researched can be objectively assessed without allowing the research process to have any impact on what is being researched. For this reason, I kept a distinct separation between data collection and data analysis. I invited the whole target population to participate – indeed, every member of the target population had an equal chance of participating.

The study also proposes a number of hypothesised relationships based on existent theory intended for universal validity. All these considerations are consistent with the adoption of the quantitative methodology and positivist paradigm chosen for this study (Easterby-Smith et al., 2002; Fulop, et al., 2002).

6.5 Study Design and Procedure

Planning the organisation and timing of the research process is crucial for successful completion, rigour, validity, and reliability of the study. This study, which is cross-sectional, employed different methods for data collection, which is to say, the survey approach, external ratings, and data from the Human Resource Department.

6.5.1 Cross-Sectional versus Longitudinal Design

The research presented in this thesis is cross-sectional because analysis involves only data collected in Time 1. Cross-sectional studies, which are descriptive in nature, use standardised methods adopted to question a random cross-section of the population, at one particular point in time, about past (retrospective) as well as current behaviour, attitudes, and events (Bowling, 2002).

The drawback in retrospective studies is their potential for selectivity in answering questions, thereby resulting in recall bias. However, the major limitation of the cross-sectional design is the difficulty in establishing association between cause and effect. Hence, cross-sectional studies can only point to statistical associations between variables but they cannot alone infer causality (Bowling, 2002).

Cross-sectional studies, which are relatively economical in relation to time and resources, are efficient in quickly surveying large numbers of people. Additionally, the researcher can easily code standardised data. Indeed, the main reason of opting for a cross-sectional design in this thesis is the limited time available for multi-method data collection of a reasonably large hospital population, as well as for the complete multilevel analysis. Besides, despite the fact that I cannot draw any conclusions on the direction of causality, the sound theoretical foundations underpinning the study, as well as the empirical predictions available in the literature, enable me to suggest the hypothesised relationships with more confidence. At the same time, this would set the stage for future longitudinal research.

Longitudinal surveys are analytic rather than descriptive. By analysing events, usually prospectively at more than one point in time, and by carefully timing the data collection points, they can suggest direction of causality between variables. Longitudinal surveys are however expensive to conduct, time-consuming and still faced with the problem of reverse causation. Associations may also be difficult to interpret due to the multifactorial nature of organisational studies (Bowling, 2002).

In planning for this research, I decided to draw the conditions from the outset for future longitudinal research. This is because I was well aware of the limitations of the cross-sectional study, not to mention the resources required to carry out a hospital-wide survey, the marketing for a satisfactory response, problems encountered with access to busy hospital units, and finally, the unique opportunity of researching an organisation on the eve of a major organisational change. Table 6.1 shows the various stages of data collection for study two.

TABLE 6.1
Study Design of Study Two

	FOCUS GROUP	PILOT STUDY	STUDY TWO	
Questionnaires from *Individual Members* of the Target Population, Nested in Units	X	X	X	
External Ratings of Hospital *Units*	X	X	X	
Human Resource Department Data		X		X

As I intended to carry this research further, for data collected in Time 1 and subsequently for Time 2 and 3, I directed participants to recall their responses on the previous six months rather than leaving it open to their speculation (Van de Ven & Ferry, 1980). I specified the timeframe in the questionnaire's introductory page as well as with the various blocks of questions. I did this to help them recall responses within a specific period of time, and also to facilitate consistency in data capture in Time 2 and 3.

6.5.2 The Survey Approach – Questionnaires

The survey is a method of collecting information from a sample of the target population, usually by self-completion questionnaires (Bowling, 2002). Surveys are the most commonly used format of the descriptive approach, offering measures of central tendency and of dispersion (Locke et al., 1998). They aim at measuring attitudes, knowledge, and behaviour as accurately as possible in order to describe populations, to study associations between variables and to establish trends. Surveys allow inferences to the broader population and generalisation to similar populations, due to their organization in natural settings. This is of particular importance in complex environments like hospitals, which are not easily reproducible in a laboratory.

Questionnaires are efficient and cost-effective tools for data collection and enable broader and more general patterns or relationships to be studied (Easterby-Smith et al., 2002). One of the major problems with questionnaires is the response rate, as it appears that only self-motivated respondents would complete and return the questionnaire back to the researcher, thereby creating a non-response bias. Indeed, the non-respondents may be the ones who have valuable information about sensitive issues, which they prefer to withhold due to personal reasons. Another limitation is lower accuracy of answering questions as the researcher has no control over the environment and is not present to motivate respondents to complete it.

At the outset, the two stages of constructing a questionnaire were planning and piloting. In the planning stage, I listed the topics of interest in relation to the aims of the study, and collated appropriate and predominantly established measures with good psychometric properties identified during the literature review I also listed additional items such as those on demography. I then related back the questions to the aims to make sure of the completeness of the tool. As explained earlier, in view of the unique timing of this data collection on the eve of a major organisational change, I kept in mind future research and therefore included a few additional scales.

With regard to the scaling method, I kept most of the scales in their original format to facilitate comparison of results. The scaling method used was the Likert scale, which is the most popular with psychologists and sociologists. The Likert scale contains a series of "opinion" statements on a person's attitude and the respondent marks, usually on a five-point or seven-point scale, and the extent to which s/he agrees or disagrees with each (Bowling, 2002).

6.5.3 External Ratings

A separate tool (Appendix 9) was prepared to capture external ratings for just one construct, namely unit performance. In contrast to the main questionnaire, delivered to the full eligible target population, forty-four raters (and two raters for the pilot study) rated several units each and therefore, received a set of the tool each. I collected data from external raters immediately after completion of the survey for each timeframe.

6.5.4 Human Resource Data

One of the variables in the study was absenteeism. Therefore, to obtain an objective and accurate measurement rather than a subjective indication, I did not include questions on absenteeism in the main questionnaire, but obtained the data of monthly sick leave for the six monthly periods under study for each individual respondent from the Human Resource Department, following all the rules for data protection as stipulated in the Data Protection Act. In fact, this data took quite a substantial amount of time to collect.

Adopting a multi-source multi-method approach is one of the steps in assuring rigour in the study.

Being fully aware that to achieve success in both the present cross-sectional study (Time 1) and the future longitudinal research, I needed to make sure of a reasonably good response rate in Time 1 and I also wanted to maintain a good level of interest for the following two waves of data collection.

6.5.5 Gaining Access

Gaining access proved to be a unique experience in negotiation as this involved approval by a research ethics committee, gaining institutional access by the health authorities in Malta and the Hospital Management, as well as copyright access for the use of some of the established measures in the questionnaire.

6.5.5.1 Approval by the Maltese Research Ethics Committee and Data Protection Commissioner

For a research study to be acceptable, it should abide by professional, legal, and social obligations in respect to the research participants involved in the study (Cormack, 1998). In line with the obligations stipulated by Maltese Constitution in the Data Protection Act, enacted in 2001, I had to seek approval by the *'University Research Ethics Committee' (UREC)* before embarking on data collection. The Data Protection Act 2001 provides for the protection of individuals against the violation of their privacy, which is considered a fundamental human right, by the processing of personal data and for matters connected therewith. To maintain these regulations, the role of a research ethics committee was to consider the ethical implications of all the research proposals, which involved human subjects (Behi & Nolan, 1995) as was the case with this research. Hallowell and Lawton (2006) claimed that ethical review has great potential to strengthen research, and should not be a bureaucratic exercise. They argue that the boundary between research methods and ethics is vague, and that ethics should contribute to research at all levels - from the construction of the research question to the collection and dissemination of data.

The Research Ethics Committee granted approval on receiving ethical expert opinion (Appendix 2). The Committee approved on the proviso that an administrator would keep the participants' unique IDs and their true identification separate from the researcher. The administrator assisted me in identifying the hospital unit leaders, and in communicating with the Human Resource Department. The administrator did not have access to the data, while I did not have access to the true identification, so much so that nobody was in possession of the three sources together (Participant's name, unique ID and actual data) that would have jeopardized anonymity.

6.5.5.2 Gaining Institutional Access

In preparing for data collection, I requested permission from the Director General Health Department, the CEO of the Hospitals, and the Medical Superintendent (Appendix 3) and held several meetings with key people in health care to gather support for the study, gain access to every hospital unit, and explain the process of how I intended to carry out this research. These included: the Permanent Secretary in the Ministry of Health, the Director General in the Department of Health, the Chief Executive Officer of the Hospital, the Medical Superintendent of the Hospital, the Directors for Human Resource and Information, the Director of Nursing, the Manager Nursing Services of the Hospital, the Chairmen of Clinical Departments in the Hospital, Medical Consultants, and Nursing Officers. The official hospital website advertised the research, and the CEO issued a circular encouraging the health care employees to participate. The relevant health department and hospital authorities granted approval for the research, and for access into both the main hospital units and also the ancillary Dermatology Unit, for the pilot study (Appendix 3).

6.5.5.3 Gaining Copyright Access

I obtained permission from the authors of the established tools in the questionnaire, namely: the Job Content Questionnaire, the Nursing Stress Scale, the Organisational

Constraints Scale, the Interpersonal Conflict at Work Scale, the Quantitative Work Scale, and the Physical Symptoms Inventory (Appendix 4). Access to the other scales in the questionnaire and external ratings was through the Work and Organisational Psychology Group at Aston, as well as through publication in peer reviewed journals.

6.5.6 Focus Group

A focus group made up of fifteen members was organised in May 2005. The members were representatives from every health care profession, including management and administration, all of whom were also *au courant* with health care research. I asked the focus group to comment on the comprehensibility of the questionnaire and on the way in which the respective professions would receive this material. The focus group served as informal piloting of the research instruments prior to going to print, as well as a way of getting feedback on the organisation of data collection. The members of the focus group were asked to fill out the questionnaire, and I timed the duration for its completion. On average, the members took half an hour to complete. I carefully evaluated the suggestions and carried out minor amendments, such as those involved in changing the response format of two scales to a more user-friendly format to enable better recall. The next step was piloting the tools in an actual hospital unit.

6.5.7 Pilot Study

Pilot work takes long and adds to the costs of the study. However, even expert advice is no substitute. Every research project is unique and has its own peculiarities and difficulties, so much so that doing away with pilot work is likely to prove more costly (Oppenheim, 2001). A pilot study is a small-scale version of the major study to refine the methodology. As I used established measures with good psychometric properties, I did not test for reliability and validity of the scales. Therefore, a small pilot study was sufficient for the following procedures.

I carried out the pilot study at the Dermatology Unit of the ancillary hospital. Although it is under the same management structure as the main hospital being studied, the Dermatology Unit is physically separate, and therefore, it was not included in the major study. The aims of the pilot were to give a trial run of the data collection plan, and to assess its feasibility. From the pilot study, I learnt that it was important to meet the head consultant and the nursing officer, and to inform them about the study. The best time to do this was after midday. Additionally, I needed both a unit-located and a centrally located collection boxes for easy access and also to preserve confidentiality. Furthermore, I had to amend the personalised letter and the questionnaire to include details on confidentiality and anonymity.

Before going to print, the project's supervisors reviewed the instruments, after which I had no further amendments to make. Furthermore, in agreement with my supervisors, I decided to distribute the questionnaires to the whole target population including the leaders of units, even though these were to be excluded from analysis. This I did to avoid having the leaders singled out and making them feel as if they were under scrutiny. I also intend using data from leaders for further research.

6.5.8 Marketing the Study and Organisation of the Survey

To make sure of successful data collection for the first phase (actual PhD study), and to leave options open for subsequent phases, I followed a data collection strategy, based on discussions held with experienced researchers within the Work and Organisational Psychology Group at Aston University, as well as on empirical evidence (Edwards et al., 2002). This included appointing seven survey coordinators, sending letters, designing posters of the study, preparing an attractive and professionally designed questionnaire, distributing questionnaires by hand to every hospital unit, and the use of wooden collection boxes in each unit and central locations for easy access (Appendix 5). After sending personalized letters, I met all the nursing officers of each unit/ward and the Chairmen of the Medical Departments to inform them about the study and the method of data collection.

The organization and implementation of the survey proceeded smoothly during the period September-October 2005 with the help of survey co-ordinators, who provided constant feedback and who received prompt support to queries arising from participants. The questionnaires were delivered to every recognised unit at the Hospital in a personalised manner to the target population of health care professionals, hospital management, administration, and ward clerical staff, appearing on the Human Resource Department staff list in August 2005.

The distribution of questionnaires took one week to finish, while the respondents were given instructions to respond within one month. I sent a reminder circular to each unit after two weeks, while survey coordinators visited the units regularly. I responded promptly to every request or problem arising during data collection. The survey coordinators were given a token of appreciation for assisting me during data collection. Furthermore, I used every avenue possible to market the research and gather support for it. Therefore, I also held short meetings with representatives of trade unions/professional associations, to explain the research process and the benefits that could accrue from such an exercise. I also presented the representatives with a brief report (Appendix 6) describing the research. The unions/associations assured me of their support, and indeed helped me to market the research through their websites and newsletters.

Additionally, I also prepared for a Lottery Draw of Prizes obtained from several sponsors to boost up the response rate (Aadahl & Jørgensen, 2003; Baron, De Wals, & Milord, 2001). I obtained approval (Appendix 7) from the Department of Public Lotto, who organised the draw on 5th December 2006, in the presence of officially Government-appointed Notary Public.

6.5.9 Feedback Reports

I negotiated with the organisation and with professional associations to give a feedback report only after completion of my PhD studies, as well as after having collected Time 2 and Time 3 intended for the future longitudinal research. This I did to avoid giving information that could prejudice respondents in the following waves of data collection. This arrangement was accepted and the reason considered valid.

6.5.10 Role of Researcher

Although by using the quantitative methodology, the researcher is independent, and the respondent is not under pressure to respond, I made sure that I followed the rules rigorously. Although I come from the medical profession, my appointment as Head of an Institute that caters for the education in nursing, midwifery and professions allied to medicine, puts me in a neutral position that is better accepted by all concerned. Furthermore, I made sure to inform participants that the study was intended for research as part fulfilment of a PhD, and that it was not organised by the hospital management. In doing so, I believe that the respondents were truthful in their answers as the purpose was not to drive their agenda towards management.

6.6 Target Population, Level of Analysis, and Sample

6.6.1 Target Population

The target population that interests the researcher is the entire population. In this study, it is heterogeneous and consists of health care professionals, health service managers, top administrators, and ward clerical staff, nested in defined hospital units. The study excluded the leaders of the units, and therefore these were not part of the target population.

The *hospital unit* refers to a *defined* and *task-specific group* of people within the hospital, led by an official leader appointed by the organisation.

6.6.2 Level of Analysis

The study is multilevel, with the result that there are two units of analyses: the individual and the unit. This is in line with what is being encouraged in the organisational sciences research (Bliese & Jex, 2002). Contextual factors resulting from higher-level groupings influence lower-level data gathered from individuals, rendering data collected from organisations intrinsically nested (Bliese & Hanges, 2004).

6.6.2.1 The Rationale of Multilevel Design

The multilevel nature of organisational studies presents researchers with conceptual, measurement and methodological challenges (Hofmann, 2002). Indeed, they are the multilevel theoretical issues namely, the definition and different types of collective constructs that drive decisions on measurement, aggregation and statistical analysis (Chan, 1998; Kozlowski & Klein, 2000; Hofmann, 2002). Since multilevel studies produce a hierarchical structure of data, data at individual level share values at the unit level. Statistically, hierarchical data structures challenge the assumptions of traditional data analysis methods, based on the violation of the assumption of independence of observations (Bliese & Hanges, 2004).

6.6.2.2 Units of Analysis at Level One and Level Two of the Study

The *unit of analysis in the questionnaire* is the *individual* health care professional, manager, administrator, and ward clerical staff, excluding the leader, *nested in hospital units* as officially configured by the hospital management. Additionally, the Human Resource Department provided individual-level data on absenteeism for the six-month period March - September 2005. In contrast, the *unit of analysis in external ratings* is *the hospital unit.*

6.6.3 Sample

Bearing in mind the multilevel nature and complexity of the study, I needed to make sure that I have a big enough sample size both of individuals as well as of hospital units that would give me good statistical power.

Statistical power is a measure of how likely a study produces a statistically significant result. The power of a test refers to the probability that it will produce a significant result at a given level of significance. Statistical power is a function of sample size, significance level and effect size (Cohen, 1997).

Multilevel analyses can only be successful at detecting the relationships of interest if there is sufficient power (Lake, 2006). Critical considerations of a design for a multilevel study would therefore be adequate sample sizes at each level of analysis, the level of randomization, and the choice of covariates. The calculation of sample sizes in a multilevel investigation is often well-informed and well-educated guesswork (Snijders, 2001). However, as testing multilevel hypotheses largely depends on the variability in the characteristics of the higher-level unit, the design strategy should be to maximise the number of units at this level (Lake, 2006).

To attain the maximum statistical power possible in this study, I did not apply any sampling technique, but invited the full eligible population to participate, which therefore provided me with the best possible number of individuals I could possibly get nested in units. This I could achieve because of a manageable size of the population, and the numbers available consequently restricted the sample size.

Indeed any sampling from this population would have reduced the sample size considerably jeopardizing any meaningful analysis. Furthermore, calculation of statistical power for this multilevel study is not applicable, as population size and non-response determined the sample size. Additionally, Hoenig and Heisey (2001) did not recommend post-hoc power calculations. Therefore, all the health care employees mentioned above, nested within the hospital units, received the questionnaire. The sample at level one therefore consisted of the target population minus the non-respondents.

6.6.3.1 Level One Sample

The level one sample consisted of one thousand, eight hundred ninety three (1,893) individuals nested in one hundred fifty seven (157) hospital units.

6.6.3.1.1 Inclusion Criteria

The inclusion criterion for the study included those health care employees who provide patient care either directly or indirectly. These include health care professionals, health service managers, top administration doing hospital-related work, and ward clerical staff, who were listed on the staff list on August 30, 2005 at the Human Resource Department, on all types of contract (full-time, part-time, and reduced hours).

6.6.3.1.2 Exclusion Criteria

The exclusion criteria included the leaders of the units, the reliever nursing pool due to their inability to identify themselves with a unit, the technical and maintenance staff, as well as some offices in administration that do not carry out hospital-related work, directly or indirectly. Only forty seven (47) leaders responded and these were excluded because the questions on leadership referred to the particular leader of the unit, and therefore, the aggregate data on leadership and team climate originated from the other members of the unit. It was felt that if I were to include the leaders' perceptions, I would have introduced a bias, primarily because the leaders were referring to their 'superior' when answering the questions on leadership. Secondly, their answers on team climate would have been more positive and potentially less congruent with the rest of the staff in that unit. This would have influenced the consensual validity of the group level construct.

6.6.3.1.3 Response Rate

The number of returned and completed questionnaires excluding the leaders was one thousand, one hundred, and thirty-seven (1,137). *The response rate was therefore 60%.* This compares well with the response rates for NHS studies in the UK, with a 53% response rates in 2003 for acute and specialist trusts. Initially, I delivered two thousand one hundred and forty-four (2,144) questionnaires. However, during the survey implementation, due to the failure on the part of HRM Department to update staff list, as well as the time lapse between August and October 2005, it became apparent that two hundred and fifty-one questionnaires (251) of these were ineligible for the survey. The main reasons were transfer to other health care services on the island or abroad, resignation from Hospital, long study leave abroad of more than six months, long sickness absence of more than ninety days prior to onset of survey, maternity leave, or parental leave. A further forty-three (43) returned their questionnaires blank, and fourteen refused the questionnaire during delivery. Moreover, taking into considerations the non-respondents, 1,137 respondents remained in the sample for further analysis.

6.6.3.2 Level Two Sample

In this section, I will discuss the methodological issues in determining the eligibility of the hospital units for further analysis, the recruitment of external raters, and the elimination of rater bias.

6.6.3.2.1 Eligibility of Sample of Hospital Units for Further Analysis

One hundred thirty-six hospital units (136) were eligible for further analysis, satisfying Dawson's (2003) selection rate, which was also published by Richter, West, van Dick, and Dawson (2006) (Appendix 8). This procedure eliminated twenty-one units from the initially identified one hundred fifty seven units within the hospital under study.

The selection rate (SR) criterion is a formula-based estimation of accuracy of aggregate measures based on incomplete group data, used to select the units, which should be included in the sample. The selection rate SR = (N-n)/Nn, which is a function of unit response rate (n) and unit size (N), aims at minimizing the standard error of the mean.

By means of Monte Carlo Simulations, Dawson (2003) shows that this formula is applicable across different types of teams and assesses the accurateness of incomplete unit-level data in predicting true scores. In this study, I have utilised the recommended selection rate of 0.32, which is the cut-off point, or the point at which the correlation between scores from incomplete data and true scores is 0.95 or higher.

6.6.3.2.2 Recruitment of External Raters

I recruited a group of forty-four external raters for the main study and two additional raters for the pilot study. The inclusion criteria for recruitment had to do with the fact that the rater was in a senior clinical or managerial position within the public health service, and that he/she was external to it, but at the same time endowed with a good knowledge of the unit. Instead, the exclusion criteria were reached in light of the fact that the rater was not working in the unit but at the same time employed with the public health service, to ensure reliable inside-information of the unit. In a meeting with each rater, I explained and discussed the items in the rating tool (Appendix 9), to make sure of a sound understanding. The recruited group of external raters provided ratings for one hundred and thirty-six units: one hundred and fourteen units rated by two raters or more, whereas twenty-two units had single ratings.

6.6.3.2.3 Rater Bias

Rater biases, such as rater strictness and leniency bias, are well recognised in multi-rater assessment. This is more so when multiple external raters rate several units of varying sizes, as is the situation in study two. D. Nebeker and P. Hanges (personal communication, October, 19, 2006) provided a new procedure that identifies estimates of rater errors, based on ordinary least squares regression. The authors emphasised that the regression/correction procedure produces accurate results with limited amounts of overlap in rater by ratee (in this study, hospital unit) matrices. Therefore, this procedure appears to be robust, and its effectiveness in identifying rater strictness and leniency bias was evident in a variety of simulated rating conditions using Monte Carlo data sets. So as to improve the accuracy, reliability, validity, and utility of the external ratings as much as possible, I have applied the Nebeker and Hanges (2006) method of correcting for rater bias as shown in Appendix 10. This appears to deal effectively with systematic errors by having only some raters rating some units and therefore having a multi-rater matrix with missing data.

6.7 Research Instruments

This section will deal with the collection of measures in the questionnaire and external raters' tool.

6.7.1 The Questionnaire

I will deal with the design and measures separately.

6.7.1.1 Designing the Questionnaire

The questionnaire (Appendix 15) included measures of relevance to this thesis as well as additional scales for additional and future research. I utilised established and psychometrically validated measures, where available. The only scale, created specifically for this study, was the one relating to the effects of the proposed move to the new hospital.

The introductory page provided brief details on the purpose of the study, confidentiality and anonymity issues, the duration to complete, instructions on how to fill in the survey, instructions to deposit the completed questionnaire in collection boxes, and my contact details.

In designing the questionnaire, I paid attention to certain details, which have methodological and analytical implications. Firstly, I designed the questionnaire into sections to aid the respondent in the logic of his/her thought process. Secondly, based on multilevel theory, the referent matched the theoretical level of the construct (Kozlowski & Klein, 2000). Therefore, for example for team climate, a group-level construct, the items referred to *'We'*, in contrast to the items on support by co-workers, which referred to 'People *I* work with…', intended for individual-level of analysis. Thirdly, I specified the timeframe of six months for recall in answering questions, to establish harmonisation of response across participants, and to lay the groundwork for future longitudinal research.

The questionnaire consisted of six sections. I will only refer to the details specific to this thesis and exclude the additional questions intended for other purposes.

Section one included questions on: the hospital unit's leadership, team structure, team climate, social support, organisational constraints, and interpersonal conflict. Section two included questions on the hospital job's work demands and workload, incidents at work, intention to leave job, emotional exhaustion, depersonalisation, personal accomplishment, vigour, dedication, and absorption at work. Section three included two sets of questions on physical well-being. Section four sought the respondents' views on the effects of the proposed move to the new hospital. Section five dealt with questions on work-life balance, and finally, Section six included questions on demographics.

6.7.1.2 The Measures

This section will only describe the measures used to answer the research questions. In the next chapter, I will provide the details on computation of scores and psychometric validation of the scales from the data in study two and I will then compare these with the psychometrics from past studies.

Most of the scales in the questionnaire are effect indicator scales (Bollen & Lennox, 1991), in which each item is assumed to represent a single underlying construct. In structural equation modelling terms, the underlying construct causes the level of the items (Spector & Jex, 1998). In contrast, *Organisational Constraints Scale* and *Physical Symptoms Inventory* are causal indicator scales, in which each item or subset of items is conceptually distinct. The items combined constitute the construct, and in structural equation modelling terms, the items cause the construct. For causal indicator scales, internal consistency reliability is not relevant (Spector & Jex, 1998).

6.7.1.2.1 Leadership

The participants were asked to respond to the leadership items while keeping in mind the leader/manager in their work unit. The leaders of the units were asked to refer to their immediate superior. The data from the leaders were intended for other purposes.

Leadership clarity (West et al., 2003) – respondents indicated the extent to which there was an overall leader/co-ordinator in the unit. There were five options. An example was *'There is a very clear leader/co-ordinator'*.

Transformational Leadership (Rafferty & Griffin, 2004) – refers to Bass' (1985) model of transformational leadership as a way to encourage employees within organizations to perform beyond expectations. Respondents were asked the extent to which they agreed/disagreed with fifteen statements, on a five-point Likert scale, ranging from *strongly disagree* and *strongly agree*. The statements were adapted from measures produced by House (1998) and Podsakoff et al. (1990). The Transformational Leadership Scale includes five dimensions, each with three items namely:

Vision - refers to the expression of an idealized picture of the future based on organizational values. An example statement is "*The leader has a clear understanding of where we are going*;" There is one item "*The leader has no idea where the organization is going*" that needed to be reverse-coded before computing the scale.

Inspirational communication - refers to a positive and encouraging attitude by the leader to build motivation and confidence. An example statement is "*The leader says positive things about the work unit*".

Intellectual stimulation – refers to the leader's ability to enhance the employees' abilities in addressing problems and in thinking about problems in new ways. An example statement is '*The leader challenges me to think about old problems in new ways*'.

Supportive leadership – refers to the leader's expression of concern for followers and acknowledgment of individual needs. An example statement is "*The leader considers my personal feelings before acting*".

Personal recognition – refers to the leader's expression of reward for the achievement of specified goals. An example statement is "*The leader commends me when I do a better than average job*".

6.7.1.2.2 Teamwork

Team Structure (Carter, 2000; NHS Staff Survey, 2004; Bell, 2003) – Participants were first asked whether they worked in a clear defined team, and if so, in how many teams and whether they work in a unidisciplinary or multidisciplinary team. Those who answered *No,* were asked to entirely skip the questions on team structure and team climate.

Those who answered *Yes* were asked six questions as part of a categorical index based on criteria that define a real or well-structured team, namely clarity of objectives, participation, role clarity, team identity, communication, sharing of objectives, and team size (Guzzo, 1996; Hackman, 1988; West, 1996). Through this index, the respondents could be assigned to one of three groups namely:

Well-structured team, if they answered *Yes to* all questions and had a team size less than 15;

Pseudoteam if they declared that they worked in a team but did not satisfy all the criteria for a well-structure team; and

No team if they answered *No* to the first question.

Team Climate Inventory (Anderson & West, 1998; NHS Staff Survey, 2004) – a theoretically based and well-validated nineteen-item instrument. The authors define team climate as a set of shared perceptions of organizational policies, practices, and procedures. The original version included 61 items, but revised versions included 38 items and nineteen items, the one used in this study. All versions have been validated and used in published research. The tool has four dimensions, namely:

Participation in the team – refers to the degree to which team members communicate, share information, collaborate, and create a safe and supportive work environment. This dimension consists of six items with five-point Likert scale: *strongly disagree* to *strongly agree*, with an example item *"We have a we are in it together attitude"*.

Support for new ideas – refers to the expectation, approval, and practical support for introducing new and better ways of working. This dimension has five items with five-point Likert scale as in the first dimension. An example item is *"This team is open and responsive to change"*.

Clarity of objectives – refers to the extent to which members understand, agree, and are committed to the team's objectives. This dimension has four items with seven-point Likert scale, ranging from *Not at all* to *Completely* when asked questions about understanding of team's objectives. An example question is *"How clear are you about what your team's objectives are?"*

Task orientation/style – refers to commitment to high quality work, with emphasis on shared accountability and assessment of policies and procedures. This dimension has four items with a seven-point Likert scale, ranging from *To a very little extent* to *To a very great extent* when asked questions such as *"Are team members prepared to question the basis of what the team is doing?"*

6.7.1.2.3 Social support

Social Support (Karasek, 1979; Karasek et al., 1998) – refers to a significant resource for health care employees at the workplace while facing work stressors. It is derived from the *Job Content Questionnaire (JCQ)*, a self-administered tool used for psychosocial job assessment. The social support scales measure two dimensions based on the source of support, namely **supervisor** (twelve items) and **co-worker support** (nine items), with five-point Likert scale ranging from *strongly disagree* to *strongly* *agree*. Within each scale, there is measurement of the four types of support as defined by House (1981), namely:

Instrumental support - by offering direct and practical help. Examples of items are *"My supervisor is helpful in getting the job done"*, and *"People I work with are competent in doing their jobs"*.

Emotional support - by showing an interest in, and understanding of problems. Examples of items are *"My supervisor is concerned about the welfare of those around him"* and *"People I work with take a personal interest in me"*.

Informational support - by providing others with useful information and knowledge. Examples of items are *"My supervisor offers new ideas"* and *"People I work with help solve job-related problems"*.

Appraisal support - by giving adequate feedback on performance that may influence a person's self-esteem. Examples of items are *"My supervisor provides me with adequate and timely feedback"* and *"People I work with provide me with adequate and timely job-related feedback"*.

Furthermore, the scales also include:

Support for the development of interpersonal social relations at the workplace. Examples of items are *"My supervisor encourages exchange of opinions and ideas"* and *"I have made a number of friends on the job"*.

Support for group/team work – Examples of items are *"My supervisor is successful in getting people to work together"* and *"People I work with encourage each other to work together"*.

6.7.1.2.4 Decision Latitude/Control

Decision latitude/control (Karasek & Theorell, 1990) – refers to the hospital employee's control over the performance of his/her job, and as in the case of social support, forms part of the *JCQ*. It is measured through two theoretical distinct sub-dimensions that are usually highly correlated, and in fact, in this study they have been combined into one construct *decision latitude/control*. The response format is a five-point Likert scale ranging from: *strongly disagree* to *strongly agree*. Two items needed to be reverse-coded prior to computation of the score. The two sub-dimensions are:

> *Skill discretion* – This six-item scale refers to the level of skills to employ. An example item is *"My job requires a high level of skill"*.
>
> *Decision authority* – This three-item scale refers to the possibilities for workers to make decisions about their work. An example item is *"On my job, I have very little freedom to decide how I do my work"*.

Furthermore, I included three additional items on group and formal decision latitude/control, which I will use for other purposes.

6.7.1.2.5 Work Stressors

Work stressors are physical or psychological stimuli to which an individual responds (Cooper & Quick, 1999). This includes a substantial group of measures that capture the complexity inherent in a hospital job. These include organisational constraints, organisational change (move to a new hospital specific to this population), the different aspects of the nature of work, namely psychological and physical work demands as well as quantitative and qualitative workload, interpersonal conflict, and incidents at work.

Organisational constraints at work (Spector & Jex, 1998) – refers to situations or things that interfere with task performance at work. The organisational constraints scale (*OCS*) includes eleven items and is based on conceptual work by Peters and O'Connor (1980), who listed eleven areas of constraints such as faulty equipment and incomplete information. Furthermore, I included two other items that emerged from the focus group, related to overcrowding of wards/units and shortage of staff. Both were indicated as potentially prevalent in the Hospital under study.

Organisational change (move to a new hospital specific to this population) – refers to perceptions on adverse and favourable effects that the proposed organisational change is having on the health care employees. This six item scale was developed within this research project and includes four perceived adverse effects such as "*The proposed move to the new hospital is adversely affecting my performance*" and two favourable effects such as "*The proposed move... is stimulating me to continuously update and develop myself professionally*". The response format is a five-point Likert scale ranging from: 1 (strongly disagree), to 5 (strongly agree).

Nature of work – refers to four aspects of measuring work as stressor, namely psychological and physical work demands, and quantitative and qualitative workload. Karasek and Theorell (1990) emphasised the difficulty to conceptualise the different aspects of work, as work stressors. In this study, I attempt to conceptually and empirically clarify the constructs.

Psychological work demands (*JCQ)* refers to the mental/psychological arousal/stimulation necessary to accomplish a task. A nine-item, five-point Likert scale, ranging from *strongly disagree* to *strongly agree*, measures it. An example item is *"My job requires long periods of intense concentration on the task"*. Three items needed to be reverse-coded prior to computation of the scale. An example of these is *"I have enough time to get the job done"*.

Physical work demands (*JCQ*) refers to the body (often-musculoskeletal part)/physical exertion inherent in the job for example bending, twisting, lifting, or other manual handling. An example item is *"My job requires lots of physical effort"*. A three-item, five-point Likert scale, ranging from *strongly disagree* to *strongly agree*, measures it.

Quantitative workload (*QWI*) (Spector & Jex, 1998) refers to *the amount or quantity of work* in a job and should be distinguished from physical work demands, which measures the extent to which there is physical exertion. *QWI* is a five-point Likert scale, in which respondents were asked to indicate the frequency of occurrence of each statement (example: "*How often does your job require you to work very fast?*"), ranging from *Less than once per month or never* to *Several times per day*.

Qualitative workload *(QualWI)* refers to the frequency in which the employee encounters difficult or mentally overwhelming situations. An example question is *"How often do you feel inadequately prepared to help with patients' needs?"* This five-item scale was developed within this research project with items adapted from the *Nursing Stress Scale* by Gray-Toft and Anderson (1981), and follows the same response format as *QWI*.

It is indeed a contribution of this research to be operationally discrete when measuring the different components of the nature of work.

Interpersonal conflict refers to the extent to which employees get along with others at work and whether they get involved in arguments or report that colleagues are being nasty to them. The Interpersonal Conflict at Work Scale *(ICAWS)* (Spector & Jex, 1998) is a four-item five-point Likert scale ranging from *never* to *very often*. An example question is *"How often do other people yell at you at work?"* Additionally, I included a question asking respondents to indicate the profession/s, with which they had most conflict.

Incidents at work *(NHS Staff Survey, 2004)* refers to the extent to which respondents experienced injuries or accidents at their hospital job over the preceding six months. The measure consists of four items with five point Likert scale ranging from *almost never* to *always*. An example question is *"During the past 6 months, how often have you been injured or felt unwell as a result of moving and handling at work?"*

6.7.1.2.6 Work Strains

Cooper and Quick (1999) provided exactly the same definitions for *strain* and *distress*. This is *"Strain is the physiological, psychological, and/or behavioural deviation from an individual's healthy functioning"* (p.4). These authors also provide a definition for *"Eustress"* that is *"the healthy, positive, constructive outcome of stressful events and the stress response"* (p.4) that is in line with the emergence of positive organisational behaviour (Luthans, 2002) which involves the study of positively oriented psychological and human resource abilities to improve performance at work. Within a hospital context, it is essential to capture both positive and negative aspects of the stress response, as it is frequently reported that health care professionals are trained to rise to the occasion, when challenged and in times of need. Therefore, psychological strain is measured through job satisfaction, intention to leave job, and burnout with its three dimensions. Physiological strain is measured through the *Physical Symptoms Inventory* (Spector & Jex, 1998). Behavioural strain is measured through absenteeism. Finally, eustress is measured through job engagement with its three dimensions, but this is done only for the purposes of establishing discriminant validity of psychological strain as a construct. This research includes a set of scales that best capture these aspects namely:

Burnout refers to a syndrome of emotional exhaustion *(EE)*, depersonalisation *(DP)*, and reduced personal accomplishment *(PA)* (Maslach & Jackson, 1981; Maslach, Jackson & Leiter, 1996). The total number of items is twenty-two and the response format is a six-point Likert scale ranging from *Almost never* to *Always*. The Maslach Burnout Inventory (*MBI*) provides a method for categorizing burnout into high, medium, and low, based on total scores of the three dimensions, that is useful for diagnostic purposes. Artificial categorization is likely to result in the misplacement of individuals and inaccurate results, as well as in a loss of statistical power, when analysed with other variables. Therefore, for the purpose of this research, I have used the three dimensions (*EE, DP, PA*) as three first order factors, in a second order factor model in which the second order factor is psychological strain. Each dimension is measured by a **separate subscale**:

Emotional exhaustion refers to depleted emotional resources, as in the case of those workers who feel they can no longer function adequately at a psychological level. The subscale has nine items that describe feelings of being emotionally drained, and exhausted by one's job. An example item is *"I feel emotionally drained from my work"*.

Depersonalisation refers to the development of negative, cynical attitudes and feelings about clients. The subscale includes five items which describe an unfeeling and impersonal response towards clients. An example item is *"I worry that this job is hardening me emotionally"*.

Reduced personal accomplishment refers to the tendency to evaluate oneself negatively, particularly with regard to one's work with clients. The subscale is, however, on personal accomplishment and not on its reduced form, and includes eight items and describes feelings of competence and successful achievement in one's work with clients. An example item is *"I feel very energetic"*.

Intention to leave job *(NHS Staff Survey, 2004)* refers to the employee's intentions with regard to his/her future in the job. It includes three items with a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. An example item is *"I often think about leaving my current post"*.

Sickness absenteeism refers to the number of days of sick leave during the period under study, in this case six months. Data on absenteeism from the Human Resource Department at the hospital are involved in the study.

Job satisfaction *(NHS Staff Survey, 2004)* refers to the perceptions of feelings or affective response experienced in a job role. It includes seven items with a five-point Likert scale ranging from *strongly disagree* to *strongly agree* in response to the question *"How satisfied are you with the following areas of your job?"* An example statement is *"The recognition I get for good work"*.

Physical Symptoms refer to the physical and somatic health symptoms thought to be associated with distress.

The **Physical Symptoms Inventory** *(PSI)* (Spector & Jex, 1998) is a causal indicator scale, in which survey participants are asked to indicate one of three options for each symptom (eighteen symptoms) namely, *"No I didn't", "Yes I did but received no medical attention for it", "Yes I did but I received medical attention for it".* Three scores are computed, which is to say the number of symptoms they had (have symptoms), the number needing medical attention (Medical symptoms), and the sum of both (Total). For the purposes of this research, the Total score is used in regression analyses.

6.7.1.2.7 Biographical Information, Composition, and Other Control Variables

The questionnaire also included details on age, gender, marital status, professional group, employment contract, time (years) in health service, and time in unit where health care employee worked at time of data collection. I also obtained an objective measure of the compositional variable: unit size from the Human Resource Department. This is different from team size that participants were asked to indicate in the questionnaire, as this refers to the team that the respondents perceive as being part of. Indeed, team size determines team structure and therefore does not affect those that claimed they did not work in teams.

Finally, I have used psychological well-being (Karasek et al., 1998) as a control variable in testing the relationships between transformational leadership and team climate, and social support and decision latitude control to minimise the effect of common method variance.

Podsakoff et al. (2003) argued that potential biases associated with common method variance occur when data for dependent and independent variables "are obtained from the same person in the same measurement context using the same item context and similar item characteristics."(p. 879). The risk of common method variance is the resulting spuriously high correlation estimates that may be sufficient to offset response accuracy, and response consistency. On the other hand, Spector (1987) argued that properly developed instruments are resistant to the method variance problem. Similarly, Harris, Cumming and Campbell (2006) found insignificant impact of common method variance when using online questionnaires.

Moreover, Brown and Keeping (2005) found that temporary mood states have little impact either on measurement or structural relationships when measuring transformational leadership. Several studies have controlled for negative affectivity as a counter-measure for over-reporting of stress in cross-sectional studies. However, Spector et al. (2000) argued that controlling for affectivity may reduce true variance. On the other hand, psychological strain is directly influenced by negative affectivity (Moyle, 1995). Therefore, in balance I have decided to use a measure of psychological well-being as a more objective control for common method bias when predicting social support and decision latitude/control.

The psychological well-being *(JCQ)* asks about the frequency with which the respondent feels symptoms that probe mental well-being. It is an effect indicator scale with six items and the response format is a five-point Likert scale, ranging from *Never* to *Very often*. An example question is *"Do you have trouble with feeling nervous, fidgety, and tense?"*

6.7.2 External Ratings of Hospital Unit Performance

Unit performance refers to the aggregate of the behaviours within that unit that are relevant to achieving the specified aims and tasks. There are conceptual issues that regard the distinction between performance and effectiveness, in that performance leads to effectiveness (Brodbeck, 1996). Performance, as it is measured in this study, is a process criterion, and therefore measures an intermediate outcome, in contrast to effectiveness, which is an outcome criterion, and therefore measures a final outcome. Therefore, work group performance according to Brodbeck (1996) should be conceptualised by three dimensions namely: motivation to work, individual members' knowledge and skills required for task completion, and group's collective performance strategies to satisfy both internal and external activities. Indeed, the external raters' tool of unit performance used in this study includes these dimensions through its seventeen items.

Unit performance is a tool (Appendix 9) adapted from the one used for primary health care, by the Aston Centre for Health Service Organisation Research, in the team effectiveness project (1999). The tool refers to the hospital unit under study, and asks the raters to rate the extent to which the hospital unit carries out each of the items, in a five-point Likert scale ranging from *1 – Not at all* to *5 – To a great extent.* The items refer to the maintenance of clinical competence, provision of information, setting of protocols, implementation of procedures, implementation of strategies for communication between members of unit such as regular meetings, conduction of audits and reviews, clarification of roles and responsibilities of unit members, and commitment to personal and professional development of staff. An example item is *"Effectively provides patients and relatives with information on hospital services"*.

The tool also rates units on their capability of keeping up-to-date profiles of patients, and adjusting members' skill-mix to satisfy these needs. An example item is *"Effectively profiles the unit/ward patients' needs"*. Additionally, there are items that measure collaboration with management and other departments/units, and also effective use of resources. Finally, two items rate units on the extent to which they implement good practice recommendations, and the extent to which they concentrate on achieving optimal patient outcomes.

6.8 Chapter Summary

The preceding chapter has detailed the methodology used for study two, while paying particular attention to the underlying philosophy of research, the research design and methods, the research setting, the study design and procedure, and the target population and sample. It has also provided details on both the level of analysis and also on the research instruments used to measure the variables in the study. Following the selection of the appropriate research instruments, the next chapter provides details and results of the testing of the scales for reliability and validity. Furthermore, I will compare the psychometrics validation of established scales from this study with those already available in the literature.

CHAPTER SEVEN

STUDY TWO

PSYCHOMETRIC VALIDATION OF RESEARCH INSTRUMENTS AND OF MULTILEVEL DATA, AND ANALYSIS STRATEGY

7.1 Chapter Overview

This chapter provides an outline of the systematic process involved in checking research instruments and data for reliability and validity to ensure rigour in the research process. I will compare the reliability and validity of established instruments from this study with analogous indices available in published research. Furthermore, because of the multilevel nature of the study, I will present indices of within-group agreement and intraclass correlations that assisted me in justifying aggregation of data to group level, and whether to acknowledge group membership for variables intended at the lower level of analysis in the study. Finally, I will discuss the analysis strategy that I adopted to test the hypothesised relationships in the study.

7.2 Rigour

Rigour refers to steps in the research process that ensure reliability and validity of the data as well as a reduction of bias. In quantitative methodology, these include systematic approach to research design, together with systematic and thorough collection, analysis and interpretation of data (Bowling, 2002). Moreover, in line with the positivist paradigm, achieving validity and reliability in a study is essential for generalisability of findings to other populations of similar/other contexts.

As described in the previous chapter, I adopted a rigorous approach in designing research and collecting data. Three assistants helped me to input data into SPSS file format. On completion, a random sample of twenty percent of the data entered by each individual were re-entered by the other individual in the group, to ensure that one re-checked the data entered by the other. A single error in a single item constituted a faulty record. The cut-off point for accepting data entered by one individual was an error rate of less than 5%. Indeed, from these three individuals, one had an error rate of 3.5%, the second had an error rate of 0%, but the third had an error rate of 6%. The data set from the third individual was re-entered and re-checked, whereas I corrected the errors detected in the data set of the first individual, with the error rate of 3.5%. Furthermore, I checked the full data set for outliers, and for values that fell outside the range of possible values (Pallant, 2005). It was only at this stage that I considered the data set in the SPSS file format suitable for further analysis.

7.3 Psychometric Validation

Psychometric validation is the process whereby a series of defined tests are conducted to assess reliability and validity of an instrument on the population group, for whom the instrument is intended (Bowling, 2002). As I will be using structural equation modelling as an analytic technique throughout study two, as well as in my approach to assess reliability and validity of the instruments, I will first discuss this technique in the next sub-section.

7.3.1 Structural Equation Modelling (SEM)

The main advantage of SEM is that it allows the isolation of measurement error, by segregating reliable true variance from measurement error variance. It also allows the modelling of latent constructs with multiple indicators. However this advantage has often presented itself as a controversial issue amongst SEM specialists. Indeed, there are two schools of thought: namely the empiricist-conservative position, which considers parcelling of items as creating a false structure and the pragmatic-liberal philosophical perspective advocating the merits of parcelling as the lowest level of data to be modelled in the creation of structural models. Little et al. (2002) claimed that "the practice is viewed as one that puts a fine sheen on an otherwise cloudy and therefore difficult to discern picture of reality" (p.152).

Study two presented a compelling justification for adopting the pragmatic approach. First I acquired a thorough theoretical understanding of the nature and dimensionality of the items to be parcelled and therefore of the nature of the latent constructs. As I will show in the next sections, the empirical justifications included achieving good psychometric properties of the constructs in terms of construct reliability, item reliability and average variance extracted, as well as good model fit statistics. Through the rigorous approach of exploratory factor analysis on a randomly selected half of the data set, followed by confirmatory factor analysis on the second half, I could confirm that the constructs exist, and that each indicator had some degree of association with the construct's true centroid (Hall Snell, & Singer Foust, 1999; Little et al. 2002). Additionally, SEM was needed to test whether the hypothesised model fits and is supported by empirical data.

Specific to study two, my aim was to model the effects of the latent constructs at a theoretically justified level of generality, thereby cancelling the effects of nuisance factors at the lower level of generality. Additionally, in line with the positivist paradigm, I strived to achieve a more parsimonious model in terms of having fewer estimated parameters in defining the construct and overall in representing the entire model. This leads to fewer chances for residuals to be correlated or dual loadings to emerge, as well as to lower sampling error (MacCallum et al., 1999). In study two, the major hypothesised relationships were based on the work stressors-to-strains. Therefore, through SEM, I could present models that attempted to approach the reality of the work stressor-to-strain scenario in hospital practice, rather than referring to isolated work stressors or strains. However, I made sure that in any hypothesised relationship, I do not have overlap of items or constructs. For example, since the dimensions of nature of work were also modelled as dimensions in total work stressors, the two constructs were never included in the same model. The same applies to the dimensions of burnout and those of psychological strain. Indeed, based on empirical findings of self-reported work stress among US managers, Cavanaugh et al. (2000) argued in favour of further investigating the dimensionality of self-reported work stress, on the premise that evaluation of work stress associated with certain stressors was not a unidimensional construct.

7.3.2 Reliability

Reliability refers to the reproducibility and consistency of the instrument. In statistical terms, the reliability of the scale indicates how free it is from random error. However, a perfectly reliable scale may still have some systematic error (Hair et al., 2006). A frequently used indicator of reliability is internal consistency, which is a measure of the degree to which the items i.e. the indicators of a latent construct are internally consistent in their measurements.

The statistic for internal consistency is Cronbach's coefficient alpha, which is a summary measure of the inter-correlations that exist among all the items that make up the scale (Lee & Hooley, 2005). Values range from zero to one, but Nunnally &

Bernstein (1994) recommended a minimum value of 0.7. Table 7.1 provides the values for the *traditional* Cronbach's coefficient alpha of the scales from the data collected in this study, so that these can be compared to values available from published research.

Table 7.1
Internal Reliability of the Scales in the Study

Scales		Cronbach's Alpha *from this Study*	Cronbach's Alpha from *Published* Research	Reference
UNIT LEVEL PREDICTORS				
Transformational Leadership	**Vision**	0.82	0.82	Rafferty and Griffin (2004)
	Inspirational Communication	0.84	0.84	
	Intellectual Stimulation	0.84	0.88	
	Supportive Leadership	0.90	0.95	
	Personal Recognition	0.92	0.96	
Team Climate	**Participation in Team**	0.92	0.89	Anderson and West (1998)
	Support for New Ideas	0.91	0.92	
	Clarity of Team Objectives	0.82	0.94	
	Task Orientation/Style	0.90	0.92	
INDIVIDUAL LEVEL MODERATORS				
Social Support	**Supervisor Support**	0.94	0.80	Karasek et al. (1998)
	Co-worker Support	0.92	0.80	
Decision Latitude/Control		0.74	0.70	Karasek et al. (1998)

Table 7.1…continued
Internal Reliability of the Scales in the Study

Scales		Cronbach's alpha from this Study	Published Cronbach's alpha	Reference
WORK STRESSORS				
Nature of Work	**Psychological Work Demands**	0.77	0.70	Karasek et al. (1998)
	Physical Work Demands*	0.88		Karasek et al. (1998)
	Quantitative Workload	0.89	0.82	Spector and Jex (1998)
	Qualitative Workload**	0.80		Gray-Toft and Anderson (1981)
Organisational Constraints Scale		0.87	0.85	Spector and Jex (1998)
Interpersonal Conflict at Work Scale		0.81	0.74	Spector and Jex (1998)
Incidents at Work±		0.63		NHS Staff Survey (2003)
Move to New Hospital±±		0.81		
STRAINS				
Psychological Strain Composite	**Job Satisfaction**	0.82	0.87	NHS Staff Survey (2003)
	Staff Intention to Leave Job	0.92	0.92	
	Emotional Exhaustion	0.89	0.85	Maslach and Jackson (1981)
	Depersonalisation	0.74	0.58	
	Personal Accomplishment	0.72	0.71	
Physiological Strain (Two Measures)	**Physical Strain***	0.73		Karasek et al. (1998)
	Physical Symptoms Inventory***			Spector and Jex (1998)
Job Engagement	**Vigour**	0.80	0.83	Schaufeli and Bakker (2003)
	Dedication	0.88	0.92	
	Absorption	0.80	0.82	
UNIT PERFORMANCE				
Unit Performance+++		0.97		Borrill et al., (2001)

* Cronbach's alpha not available in published studies; ** Adapted from Gray-Toft and Anderson (1981); ± Response format changed from Yes/No to 6-point Likert Scale; ±±Developed for this research; ***Causal indicator scale: Cronbach's alpha is irrelevant; +++ External ratings.

Table 7.1 purposefully does not include coefficient alphas for the second order factors: transformational leadership, team climate, social support, nature of work, psychological strain, and job engagement because of dimensionality issues. Getting a high coefficient alpha in multidimensional scales does not mean unidimensionality. This is because coefficient alphas measure the unique and common item variance in a scale and not what that common variance consists of (Gerbing & Anderson, 1988). Therefore, in multidimensional scales, one cannot rely on the traditional coefficient alphas (Lee & Hooley, 2005).

Hair et al. (2006) however, proposed the use of construct reliability (CR) in conjunction with structural equation modelling models, rather than the traditional coefficient alpha. Indeed, as structural equation modelling was used in the analyses of study two, I am hereby using the structural equations approach to reliability as suggested by Hair et al. (2006, p.777). Construct reliability is calculated from the squared sum of standardised factor loadings (λ_i) for each construct and the sum of the error variance terms for a construct (δ_i) using the formula (7.1):

$$CR = \frac{\left(\sum_{i=1}^{n} \lambda_i\right)^2}{\left(\sum_{i=1}^{n} \lambda_i\right)^2 + \left(\sum_{i=1}^{n} \delta_i\right)} \tag{7.1}$$

Reliability is also an indicator of convergent validity and therefore I will present the complete picture of reliability and validity of the constructs in the next sections.

7.3.3 Validity

Validity is the extent to which a variable or set of variables such as a multi-item scale correctly represents the construct it is designed to measure (Hair et al., 2006). In statistical terms, a valid measure should have minimal systematic error besides minimal random error. There are three broad types of validity namely: *measurement validity*, which refers to the validity of measures and manipulations; *internal validity*, which refers to the degree to which it measures what it is supposed to measure; and *external validity*, which refers to the generalisability of the research findings to the wider population (Bowling, 2002).

With regard to measurement validity, I considered the following:

(a) *Content validity* refers to the degree to which the operational definitions measure *actually* and *only* the component variables. Content validity is, therefore, a theoretical concept, where expert judgements provide logical and objective assessments. It is the extent to which the instrument appears to thoroughly assess and include the full scale of the characteristics, or domains it intends to measure (Bowling, 2002). Before going to print, my supervisors approved all the instruments used in the study.

(b) *Construct validity* refers to the degree to which variables actually and only reflect the hypothetical construct (Hair et al., 2006). Construct validity is made up of four components, namely convergent validity, discriminant validity, nomological validity and content validity, which has been discussed above and needs to be established prior to any theoretical testing when using confirmatory factor analysis (CFA).

Convergent validity refers to the extent to which indicators of a specific construct converge or share a high proportion of variance in common. Convergent validity of CFA results must be supported by item reliability, construct reliability, and average variance extracted (Hair et al., 2006). Item reliability denotes the amount of variance in an item due to the underlying construct. *Discriminant validity*, which is the extent to which a construct is truly distinct from other constructs. *Nomological validity* is tested by examining whether the correlations among the constructs in a measurement theory make sense (Hair et al., 2006).

First, I examined construct validity by means of confirmatory factor analysis, which is a theory-testing approach using AMOS version 6.0 (Arbuckle, 2006). This I did to confirm the structures of the second-order factor models for *transformational leadership*, *team climate*, and *social support,* already identified in published research.

Validity of Transformational Leadership, Team Climate and Social Support

For *transformational leadership* (*TL*), as illustrated in Table 7.2, I tested the five hypothesised models against each other. The second-order factor model (*TL* being the second order factor), was tested against a five-factor model (representing the five dimensions of transformational leadership), a one-factor model (assuming participants do not differentiate between the dimensions but that TL exists as one-factor), and a null-factor model (the data does not yield a single factor). I tested the five-factor model with both uncorrelated factors (indicating that a super-ordinate factor does not exist), and correlated factors (indicative of existence of a super ordinate factor).

Table 7.2: Fit Indices of Confirmatory Factor Analysis for the Transformational Leadership Scale

	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	12339.04	120			.300 (.295, .304)	102.83
Five-factors (uncorrelated) [a]	3824.57	90	.69	.59	.191(.186, .197	42.50
One-factor [b]	2436.19	91	.81	.75	.151(.146, .156)	26.77
Five-factors (correlated) [c]	496.74	80	.97	.95	.068 (.062, .074)	6.21
Second order factor with five first order factors [d]	532.40	85	.96	.95	.068 (.063, .074)	6.26

Note. N=1,137

CFI= Comparative Fit Index; TLI = Tucker Lewis Index; RMSEA = Root Mean Square Error of Approximation with LO 90, HI 90 referring to the limits of 90% confidence interval for RMSEA; df = Degrees of freedom

Second-order factor is transformational leadership; five first-order factors are vision, inspirational communication, intellectual stimulation, supportive leadership, and personal recognition.

[a] Difference five- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 8514.47(30)***

[b] Difference one-factor and five- factor (uncorrelated): $\Delta\chi^2$ (df)= 1388.38(1)***

[c] Difference five-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=1939.45(11)***

[d] Difference second order factor and five-factor (correlated) model: $\Delta\chi^2$ (df)=381.173(3)***

*** $p<.001$

For the five-correlated factor and second-order factor models, Table 7.2 shows high values for CFI and TLI indices above 0.95 (Bentler, 1990). Although a value of 0.9 was originally considered a value for a good model fit, Hu and Bentler (1999) advised a revised cut-off point close to 0.95. Additionally, the two models show an optimal RMSEA of less than 0.07, as well as optimal upper and lower limits of the 90% confidence interval for the population value of RMSEA. Browne and Cudeck (1993) recommended a value of 0.08 or less as indicating a reasonable error of approximation. RMSEA takes into account the error of approximation in the population, in order to be able to assess how well the model with unknown but optimally chosen parameter values fits the population (Bryne, 2001). The recommended range for the ratio χ^2/df is between two and five, (Arbuckle, 1996). However, in contrast to the fit-indices above, the drawback of this index is its dependency on sample size. Indeed, the ratio for the two models, achieved through analysis of the full sample, is slightly above six. The ratio drops down to three when I repeated the analysis on a randomly selected half of the sample.

I tested the improvement of model fit by calculating the differences in χ^2 values in relation to degrees of freedom for each model. The test indicates a significant model improvement for the correlated five-factor model which fits the data best. However, overall, these indices are suggestive of a good model fit for transformational leadership as a second-order construct, with the result that I could calculate the composite score based on the mean of the mean scores for each dimension. I carried out similar steps to validate the constructs: team climate and social support. Table 7.3 shows optimal model fit indices for *team climate* (*TCI*).

Table 7.3: Fit Indices of Confirmatory Factor Analysis for the Team Climate

	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	12788.40	190			.241 (.238, .245)	67.31
Four-factors (uncorrelated) [a]	2304.69	152	.83	.79	.112 (.108, .116)	15.162
One-factor [b]	3582.00	153	.73	.66	.141(.137, .145)	23.41
Four-factors (correlated) [c]	597.95	146	.96	.95	.052 (.048, .057)	4.10
Second order factor with four first order factors [d]	757.15	149	.95	.94	.060 (.056, .064)	5.1

Note. N=1,137. *** *p<.001*

Second-order factor is team climate; four first-order factors are participation, support for new ideas, clarity of objectives, and task orientation.

[a] Difference four- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 10483.71(38)***

[b] Difference one-factor and four- factor (uncorrelated): $\Delta\chi^2$ (df)= 1277.31(1)***

[c] Difference four-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=2984.05(7)***

[d] Difference second order factor and four-factor (correlated) model: $\Delta\chi^2$ (df)=159.2(3)***

For the four-correlated factor and second-order factor models, I obtained high values for CFI and TLI indices above 0.94, which is close to the cut-off point suggested by Hu and Bentler (1999). Additionally, the two models present an optimal RMSEA of less than 0.6. The ratio χ^2/df for the two models also is below 5.0 despite the relatively large sample size. Overall, these indices are suggestive of a very good model fit for team climate as a second-order construct. Consequently, I calculated the composite score based on the mean of the mean standardized scores for each dimension. Standardization was necessary because of differences in response formats across the four scales.

Similarly, Table 7.4 shows the model fit indices for *total social support* (*TSS*).

Table 7.4: Fit Indices of Confirmatory Factor Analysis for Total Social Support

	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	16367.88	231			.248 (.245, .252)	70.86
Two-factors (uncorrelated) [a]	1629.29	189	.91	.89	.082 (.078, .086)	8.62
One-factor [b]	7064.58	190	.57	.48	.179(.175, .182)	37.18
Two-factors (correlated) [c]	1537.12	188	.92	.90	.080 (.076, .083)	8.18
Second order factor with two first order factors [d]	1537.12	190	.92	.90	.080 (.076, .083)	8.18

Note. N=1,137.

Second-order factor is team climate; two first-order factors are supervisor support and co-worker support.

[a] Difference two- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 14738.59(42)***

[b] Difference one-factor and two- factor (uncorrelated): $\Delta\chi^2$ (df) = 5435.29(1)***

[c] Difference two-factor (correlated) and one-factor: $\Delta\chi^2$ (df) =146647.42(2)***

[d] Difference second order factor and two-factor (correlated) model: $\Delta\chi^2$ (df) =0(2)

*** *p<.001*

For the two-correlated factor and second-order factor models, I obtained values for CFI and TLI indices above 0.90, which is close to the cut-off point as was suggested earlier on by Bentler (1990). Additionally, the two models present an RMSEA of 0.8 which is above the recommended 0.7. The ratio χ^2/df for the two models is 8.2. There is no statistical difference between the second-order factor model and the correlated four-factor model. The indices for total social support show reasonably good but not ideal model fit indices. For instance, RMSEA at 0.8 is exactly at the cut-off point, while CFI and TLI are just over 0.9. However, Karasek (1998) had already identified total social support as the sum of supervisor and co-worker support.

Therefore, I decided to retain the same number of items as in the original scales as they appear in *JCQ*. I accepted the indices of model fit for total social support. On this basis, I calculated the composite score, by taking the mean of the mean scores for each dimension.

The rules of thumb for construct validity (Hair et al., 2006) are: a) standardised loading estimates of 0.5 or higher, and ideally 0.7 or higher b) average variance extracted (VE) of 0.5 or greater to suggest adequate convergent validity and c) a construct reliability of 0.7 or higher to indicate adequate convergence or internal consistency.

Tables 7.5a and 7.5b (overleaf), show that for transformational leadership, team climate, and social support, the critical ratios for all the factor loadings are significant with $p < 0.01$, assuring item reliability. Construct reliability estimates, which should be greater than 0.7 and are preferred over the Cronbach's alpha, range from 0.96 to 0.99. The average variance extracted, which should be above 0.50, measures the amount of variance explained by the construct (Hair et al., 2006). The average variance extracted is all above 0.5, and range from 0.52 to 0.79.

Table 7.5a: Reliability and Validity of Transformational Leadership and Team Climate

Constructs	Items	Item Reliability				CR	VE±
		Factor Loading	SE	Standardised Loading	Critical Ratio		
			Transformational Leadership (TL)				
Transform-ational Leadership	Vision	0.55	0.039	0.82	13.87***	0.99	0.76
	Inspirational Communication	0.85	0.079	0.96	10.74***		
	Intellectual Stimulation	0.65	0.036	0.82	18.00***		
	Supportive Leadership	0.88	0.039	0.88	22.43***		
	Personal Recognition	0.90	0.040	0.86	22.66***		
Vision	TL1	1.00		0.58		0.97	0.61
	TL2	1.35	0.089	0.82	20.81***		
	TL3	1.51	0.097	0.89	20.55***		
Inspirational Commun-ication	TL4	1.00		0.43		0.96	0.50
	TL5	0.99	0.094	0.78	10.62***		
	TL6	1.10	0.102	0.83	10.82***		
Intellectual Stimulation	TL7	1.00		0.76		0.98	0.64
	TL8	1.07	0.053	0.81	20.23***		
	TL9	1.13	0.055	0.83	20.73***		
Supportive Leadership	TL10	1.00		0.86		0.99	0.75
	TL11	1.02	0.036	0.86	20.05***		
	TL12	1.04	0.037	0.87	28.44***		
Personal Recognition	TL13	1.00		0.88		0.99	0.79
	TL14	0.99	0.029	0.93	34.50***		
	TL15	0.88	0.029	0.86	30.01***		
			Team Climate (TC)				
Team Climate	Participation	0.63	0.037	0.76	16.74***	0.98	0.70
	Support for New Ideas	0.66	0.036	0.78	18.12***		
	Objectives	0.95	0.051	0.87	18.74***		
	Task Style	1.28	0.057	0.92	22.52***		
Team Participation	TC1	1.00		0.82		0.82	0.64
	TC2	1.02	0.046	0.78	22.38***		
	TC3	0.94	0.042	0.78	22.31***		
	TC4	1.04	0.041	0.85	25.47***		
	TC5	1.02	0.040	0.85	25.46***		
	TC6	0.94	0.048	0.72	19.66***		
Support for New Ideas	TC7	1.00		0.88		0.99	0.69
	TC8	0.86	0.036	0.78	23.69***		
	TC9	0.97	0.040	0.79	24.16***		
	TC10	0.96	0.036	0.84	27.15***		
	TC11	0.99	0.036	0.85	27.98***		
Team Objectives	TC12	1.00		0.82		0.98	0.52
	TC13	0.90	0.075	0.51	11.99***		
	TC14	0.90	0.049	0.72	18.24***		
	TC15	0.91	0.044	0.79	20.65***		
Team Task Style	TC16	1.00		0.88		0.99	0.69
	TC17	0.85	0.034	0.83	25.35***		
	TC18	0.83	0.035	0.80	23.81***		
	TC19	0.90	0.036	0.82	24.92***		

***p<0.001; CR= Construct Reliability; ± VE=Average variance extracted - summary indicator of convergence = the sum of the squared standardised factor loadings (λ_i^2) divided by the number of items.

Table 7.5b: Reliability and Validity of Social Support

Constructs	Items	Item Reliability				CR	VE±
		Factor Loading	SE	Standardised Loading	Critical Ratio		
		Social Support (SS)					
Social Support	Supervisor	0.55	0.039	0.82	13.87***	0.94	0.52
	Co-Worker	0.85	0.079	0.96	10.74***		
Supervisor Support	SS1	1.00		0.84		0.99	0.59
	SS2	0.91	0.037	0.79	24.30***		
	SS3	0.88	0.035	0.81	25.03***		
	SS4	0.87	0.037	0.78	23.68***		
	SS5	0.92	0.037	0.81	25.12***		
	SS6	0.65	0.039	0.60	16.63***		
	SS7	0.34	0.040	0.33	8.44***		
	SS8	0.85	0.035	0.79	24.20***		
	SS9	0.94	0.035	0.84	26.57***		
	SS10	0.94	0.036	0.83	26.28***		
	SS11	0.95	0.036	0.83	26.21***		
	SS12	0.93	0.036	0.82	25.80***		
Co-Worker Support	CS1	1.00		0.57		0.96	0.55
	CS2	1.12	0.086	0.65	13.12***		
	CS3	1.45	0.103	0.72	14.11***		
	CS4	1.35	0.093	0.76	14.54***		
	CS5	1.45	0.104	0.71	13.89***		
	CS6	1.18	0.086	0.69	13.66***		
	CS7	1.72	0.111	0.85	15.48***		
	CS8	1.61	0.102	0.87	15.71***		
	CS9	1.53	0.103	0.79	14.88***		

***p<0.001

Reliability and Validity of Nature of Work

Nature of work is a second-order factor designed specifically for this study. The aim is to create a composite measure of the construct after validation for further analysis. The development of the latent construct "nature of work" is justified on the basis of theoretical, empirical, and psychometric considerations (Little et al., 2002). The clustering of items on psychological and physical work demands, as well as those on quantitative and qualitative workload justifies their parcelling.

Exploratory factor analysis on a randomly selected half of the data set, followed by confirmatory factor analysis on the second half provided a more parsimonious model and a latent construct with a defined level of generality.

Construct Reliability and Validity of Nature of Work

The literature dealt with one/two aspects of the nature of work, the most prominent being psychological demands and physical exertion (Karasek & Theorell, 1990), and a quantitative workload as distinguished from a qualitative one (Spector & Jex, 1998). This study attempts to contribute to knowledge by looking at all the facets in measuring the nature of work. I carried out individual level analysis to examine construct validity by means of confirmatory factor analysis *(CFA)* using AMOS version 6.0 (Arbuckle, 2006) on two randomly selected halves of the data set (Table 7.6, Table 7.7).

Table 7.6: Fit Indices of Confirmatory Factor Analysis for Nature of Work on the First Randomly Selected Half of the Data Set.

FIRST HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	6146.60	253			.201 (.196, .205)	24.30
Four-factors (uncorrelated) [a]	1477.95	209	.79	.74	.102 (.098, .107)	7.07
One-factor [b]	2592.29	210	.60	.51	.140(.135, .145)	12.34
Four-factors (correlated) [c]	854.07	203	.90	.86	.074 (.069, .080)	4.21
Second order factor [d]	860.43	205	.90	.87	.074 (.069, .079)	4.20
Second order factor model with three covariances [e]	700.70	202	.92	.90	.065(.060, 0.71)	3.47

Note. N=567 for half of the data set. *** *p<.001; * p<.05*

Second-order factor is nature of work; four first-order factors are psychological work demands, physical work demands, quantitative workload, and qualitative workload.

[a] Difference four- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 4668.65(44)***

[b] Difference one-factor and four- factor (uncorrelated): $\Delta\chi^2$ (df)= 1114.34(1)***

[c] Difference four-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=1738.22(7)***

[d] Difference second order factor and four-factor (correlated) model: $\Delta\chi^2$ (df)=6.36(2)*

[e] Difference second order factor model with three covariances and second order factor models: $\Delta\chi^2$ (df)=159.73(3)***

Table 7.6 shows that *CFA* yielded reasonably good RMSEA, whereas CFI is more than 0.9. The additional covariances between errors (Figure 7.1) inserted, based on conceptual reasoning and according to suggested modification indices, only minimally improved the model fit. Although these results did not achieve the fit indices as suggested by Hu and Bentler (1999), they provide an acceptable level of construct validity. I repeated *CFA* using the second half of the data set and yielded very similar results (Table 7.7).

Table 7.7: Fit Indices of Confirmatory Factor Analysis for Nature of Work on the Second Randomly Selected Half of the Data Set.

SECOND HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	5752.55	253			.198 (.194, .203)	22.74
Four-factors (uncorrelated) [f]	1367.33	209	.80	.75	.100 (.095, .105)	6.54
One-factor [g]	2546.23	210	.58	.49	.142 (.137, .147)	12.13
Four-factors (correlated) [h]	780.79	203	.90	.87	.072 (.066, .077)	3.85
Second order factor [i]	793.89	205	.90	.87	.072 (.066, .077)	3.87
Second order factor model with three covariances [j]	686.371	202	.91	.90	.066 (.060, .071)	3.40

Note. N=567. Second-order factor is nature of work; four first-order factors are psychological work demands, physical work demands, quantitative workload, and qualitative workload. ****p<.001*

[f] Difference four- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 4385.22(44)***

[g] Difference one-factor and four- factor (uncorrelated): $\Delta\chi^2$ (df)= 1178.9(1)***

[h] Difference four-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=1765.44(7)***

[i] Difference second order factor and four-factor (correlated) model: $\Delta\chi^2$ (df)=13.1(2)***

[j] Difference second order factor model with three covariances and second order factor models: $\Delta\chi^2$ (df)=107.52(3)***

Figure 7.1 illustrates the measurement model for "nature of work", with the three covariances as specified above.

Figure 7.1: Second Order Factor (Nature of Work) Model with Three Covariances

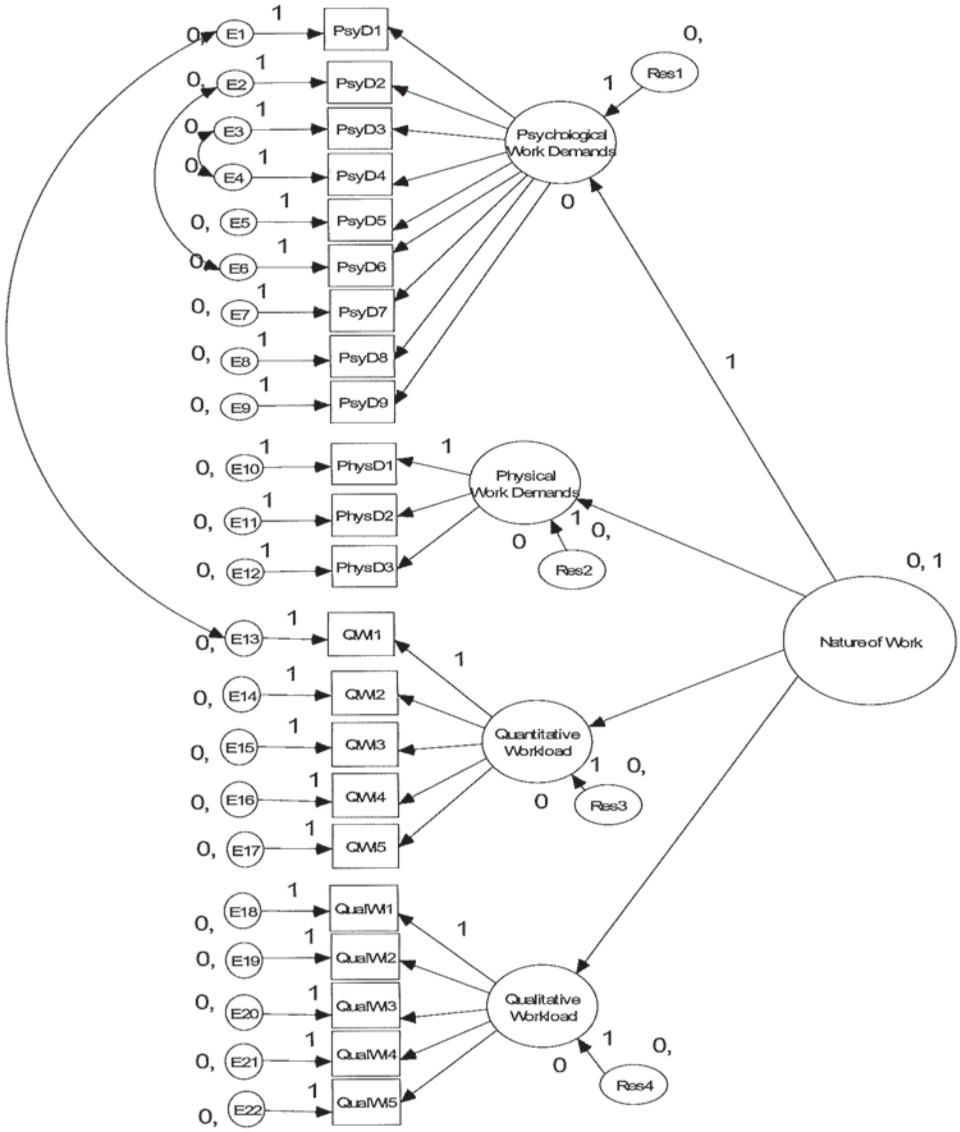


Table 7.8 shows that for *nature of work*, the critical ratios for all the factor loadings are significant with $p < 0.01$, assuring item reliability. Construct reliability estimates range from 0.97 to 0.99. The average variance extracted is all above 0.5, except for psychological demands, which is 0.31.

Table 7.8
Reliability and Validity of Nature of Work

	Nature of Work						
		Factor Loading	SE	Standardised Loading	Critical Ratio	CR	VE
Nature of Work	Psychological Demands	1.00		0.91		0.98	0.51
	Physical Demands	0.58	0.047	0.58	12.23***		
	Quantitative Workload	0.84	0.048	0.28	17.56***		
	Qualitative Workload	0.21	0.038	0.90	5.57***		
Psychological Demands	PsyD 1	1.00		0.66		0.99	0.31
	PsyD 2	0.55	0.034	0.76	16.31***		
	PsyD 3	0.50	0.044	0.51	11.08***		
	PsyD 4	0.56	0.046	0.57	12.24***		
	PsyD 5	0.21	0.039	0.25	5.50***		
	PsyD 6	0.43	0.038	0.52	11.26***		
	PsyD 7	0.35	0.044	0.37	7.92***		
	PsyD 8	0.66	0.040	0.77	16.35***		
	PsyD 9	0.32	0.041	0.36	7.811***		
Physical Demands	PhysD 1	1.00		0.85		0.98	0.71
	PhysD 2	1.12	0.055	0.76	20.46***		
	PhysD 3	1.21	0.049	0.91	24.38***		
Quantitative Workload	QW 1	1.00		0.81		0.99	0.64
	QW 2	0.93	0.042	0.83	22.13***		
	QW 3	0.99	0.053	0.73	18.72***		
	QW 4	0.98	0.043	0.84	22.63***		
	QW 5	1.01	0.055	0.77	19.92***		
Qualitative Workload	QualW 1	1.00		0.63		0.97	0.50
	QualW 2	1.33	0.083	0.91	15.93***		
	QualW 3	1.24	0.079	0.86	15.72***		
	QualW 4	0.79	0.071	0.54	11.03***		
	QualW 5	0.53	0.074	0.34	7.20***		

*** $p<0.01$

Discriminant Validity of Nature of Work

Nature of work was assessed for discriminant validity by carrying out exploratory factor analysis using SPSS version 14.0, with items measuring different work stressors, namely organisational constraints, interpersonal conflict at work, incidents at work, move to new hospital, and *nature of work.* High discriminant validity would be indicated if the factor structure clearly differentiates *nature of work* from other scales. Furthermore, in line with the construct's four-factor structure, the *nature of work* subscales, as expected, loaded on four different factors, thereby providing additional support to the confirmatory factor analysis of the construct.

Table 7.9 indicates that differential validity is supported, because *nature of work*, through its four factors, is distinct from the other work stressors, namely organisational constraints, interpersonal conflict, and move to new hospital. The factor loadings of *incidents at work* were all below 0.3, except one which loaded on *interpersonal conflict at work*. Therefore the construct *incidents at work* was not identified as a distinct factor.

The relationships among the *nature of work* items showed that psychological demands, physical demands, quantitative workload and qualitative workload are clearly identified as separate factors. However, two items (items 18 and 19) intended to measure psychological demands loaded on quantitative workload and not all the items reached a factor loading of 0.3. This explains the covariance between errors 1 and 13, in Figure 7.1.

The results show adequate construct reliability and validity. Therefore, I calculated "nature of work" as a composite measure, based on the mean scores of the four measures.

Table 7.9: Pattern Matrix. Maximum Likelihood Analysis of Self-Report Data and Oblique Rotation

ITEMS	NATURE OF WORK				OTHER WORK STRESSORS			
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
	PhysD	PsyD	QW	QualW	OC	JC	ICAWS	MoveNH
1. How often do you find it difficult or impossible to do your job because of poor equipment or supplies?	-.076	.019	-.048	.035	**.937**	-.070	-.018	.055
2. How often do you find it difficult or impossible to do your job because of organizational rules and procedures?	.015	.039	.046	-.015	**.412**	.286	.089	.017
3. How often do you find it difficult or impossible to do your job because of other employees?	-.018	.082	-.035	-.024	.118	.339	.205	.000
4. How often do you find it difficult or impossible to do your job because of your supervisor?	-.110	.109	-.040	-.079	.116	.392	.098	.055
5. How often do you find it difficult or impossible to do your job because of lack of equipment or supplies?	-.059	-.002	.000	.032	**.901**	.000	-.013	.030
6. How often do you find it difficult or impossible to do your job because of inadequate training?	-.017	-.022	-.037	.091	.095	**.661**	-.128	.000
7. How often do you find it difficult or impossible to do your job because of interruptions by other people?	.064	.252	.036	.046	.050	.240	.066	.043
8. How often do you find it difficult or impossible to do your job because of lack of necessary information about what to do/how to do it?	.005	-.020	.048	.066	-.060	**.847**	-.118	.016
9. How often do you find it difficult or impossible to do your job because of conflicting job demands?	-.023	.223	.036	-.026	-.006	**.588**	.064	-.002
10. How often do you find it difficult or impossible to do your job because of inadequate help from others?	-.008	.092	.031	-.005	-.013	**.530**	.154	-.002
11. How often do you find it difficult or impossible to do your job because of incorrect instructions?	-.056	-.055	.071	.026	.034	**.653**	.088	-.007
12. How often do you find it difficult or impossible to do your job because of overcrowding of ward/unit?	-.150	.321	.019	.116	.161	.090	.075	.026
13. How often do you find it difficult or impossible to do your job because of shortage of staff?	-.066	**.407**	.095	.055	.159	.158	.031	.057
14. How often do you get into arguments with others at work?	-.014	.086	-.029	-.003	-.011	.012	**.581**	.010

PhysD: Physical Demands; PsyD: Psychological Demands; QW: Quantitative Workload; QualW: Qualitative Workload OC*: Constraints directly due to organisation; JC*: On-the-Job Constraints; ICAW: Interpersonal Conflict at Work; MoveNH: Move to New Hospital. * These together form the Organisational Constraints Scale (Causal Indicator Scale).

(Continued overleaf)

Table 7.9: Continued

ITEMS	NATURE OF WORK				OTHER WORK STRESSORS			
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
	PhysD	PsyD	QW	QualW	OC	JC	ICAWS	MoveNH
15. How often do other people yell at you at work?	-.005	.035	.007	.059	-.034	-.076	**.742**	.007
16. How often are people rude to you at work?	-.006	.016	.090	.011	.059	-.066	**.801**	-3.3E005
17. How often do other people do nasty things to you at work?	-.011	-.090	.028	-.038	.017	.025	**.738**	.020
18. My job requires working very fast	-.154	.219	**.415**	.023	-.031	-.015	.001	.039
19. My job requires working very hard	-.201	.280	**.441**	-.040	.026	-.064	-.041	-.037
20. Reverse coded: I am not asked to do an excessive amount of work	-.050	**.394**	.265	-.042	.039	-.026	.069	-.042
21. Reverse coded: I have enough work to get the job done	-.010	**.479**	.250	.035	.096	.030	-.021	.017
22. Reverse coded: I am free from conflicting demands that others make	.049	**.419**	.017	-.034	.021	.092	.136	-.074
23. My job requires long periods of intense concentration on the task	-.089	.237	.235	-.043	-.014	-.067	-.036	-.018
24. My tasks are often interrupted before they can be completed, requiring attention at a later time	.047	**.547**	.007	.131	-.036	.110	.025	.073
25. My job is very hectic	-.160	**.415**	.386	.003	-.017	-.004	.035	.030
26. Waiting on work from other people or departments often slows me down on the job	-.107	.289	.028	.072	.093	.066	-.024	.017
27. My job requires lots of physical effort	**-.803**	.082	.099	.015	.029	-.022	-.001	-.083
28. I am often required to move or lift patients or very heavy loads on my job	**-.796**	-.002	.037	-.041	.027	.011	.020	-.030
29. My work requires rapid and continuous physical activity	**-.838**	-.023	.143	.005	.045	-.017	.023	-.074
30. How often have you been injured or felt unwell as a result of moving and handling?	**-.588**	.026	-.021	-.003	.068	.034	.008	.040
31. How often have you been injured or felt unwell as a result of needle stick and sharp injuries?	-.123	-.031	-.054	.064	-.078	.062	.134	.049
32. How often have you been injured or felt unwell as a result of slips, trips or falls?	-.235	.014	-.062	.055	-.026	.076	.084	.063
33. How often have you been injured or felt unwell as a result of exposure to dangerous substances?	-.239	-.163	.078	.066	.057	.099	.063	.051

PhysD: Physical Demands; PsyD: Psychological Demands; QW: Quantitative Workload; QualW: Qualitative Workload; OC*: Constraints directly due to organisation; JC*: On-the-Job Constraints; ICAW: Interpersonal Conflict at Work; MoveNH: Move to New Hospital. * These together form the Organisational Constraints (Causal Indicator Scale).

(Continued overleaf)

Table 7.9: Continued

ITEMS	NATURE OF WORK				OTHER WORK STRESSORS			
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
	PhysD	**PsyD**	**QW**	**QualW**	**OC**	**JC**	**ICAWS**	**MoveNH**
34. How often does your job require you to work very fast?	-.044	-.070	**.802**	.022	-.031	.035	.057	.057
35. How often does your job require you to work very hard?	-.030	-.108	**.893**	-.050	-.002	.060	.036	-.015
36. How often does your job leave you with little time to get things done?	.071	.067	**.673**	.152	.029	.022	.031	.016
37. How often is there a great deal of work?	.030	.013	**.826**	.030	.013	-.012	-.012	.008
38. How often do you have to do more work than you can do well?	-.069	.125	**.585**	.189	.029	.080	-.002	.064
39. How often are you asked a question by a patient / colleague for whom you do not have an adequate answer?	.019	.056	.156	**.652**	-.081	.078	-.015	-.020
40. How often do you feel inadequately prepared to help with patients' needs?	-.021	.025	-.034	**.920**	-.011	-.063	-.005	-.031
41. How often do you feel inadequately prepared to help the patients' family?	-.063	.053	-.050	**.836**	-.012	-.110	.019	-.033
42. How often do you feel uncertain regarding equipment's operation and functioning?	.049	-.065	.009	**.498**	.106	.087	-.015	.061
43. How often are you left alone to deal with an emergency?	.044	.003	.114	.293	.102	.069	.114	.021
44. The proposed move to the new hospital is adversely affecting the way my unit/ward functions	.028	-.032	.046	-.010	.094	.003	-.007	**.673**
45. The proposed move to the new hospital is adversely affecting my performance	.104	-.042	.010	.048	-.021	-.010	.033	**.903**
46. The proposed move to the new hospital is adversely affecting me emotionally	.060	-.003	-.030	.074	.020	.001	.042	**.845**
47. The proposed move to the new hospital will adversely affect my job security	.026	.045	.004	-.050	.068	.040	.020	**.498**
48. The proposed move to the new hospital is positively influencing me in my professional career	-.088	.015	.004	-.033	-.089	-.038	-.030	.262
49. The proposed move to the new hospital is stimulating me to continuously update and develop myself professionally	-.158	.013	.026	-.006	-.092	-.106	-.070	.112

PhysD: Physical Demands; PsyD: Psychological Demands; QW: Quantitative Workload; QualW: Qualitative Workload; OC*: Constraints directly due to organisation; JC*: On-the-Job Constraints; ICAW: Interpersonal Conflict at Work; MoveNH: Move to New Hospital. * These together form the Organisational Constraints (Causal Indicator Scale).

Construct Reliability and Validity of Work Stressors

The reasons for justifying the development of the latent construct "work stressors" is similar to that for "nature of work". However, my goal here is to model the effects of a construct that holistically captures the hospital unit member's perceptions of work stressors in an attempt to get closer to the level of generality as proposed in the conceptual framework. The items for "nature of work" have indeed been parcelled in the construct "work stressors". Therefore, these constructs will not be entered in the same regression equations.

Based on the results of the exploratory factor analysis in Table 7.9, and with the aim of obtaining a composite score for the work stressors, I tested an eight-factor model using confirmatory factor analysis (CFA) with AMOS version 6.0 (Arbuckle, 2006) on two randomly-selected halves of the sample. I followed the same rationale of testing the hypothesised eight-factor model (correlated and uncorrelated) against a one-factor model and a null-factor model. As CFA yielded an initial poor fit for the eight- and the one-factor models, I deleted two items according to the suggested modification indices and justified by theoretical considerations. Indeed, the two deleted items (items 18 and 25 in Table 7.9) were highly correlated with two other items (items 34 and 19 in Table 7.9), namely "*My job requires working very fast'*" was deleted as it was highly correlated with "*How often does your job require you to work very fast?*"; and *My job is very hectic"* was deleted as it was highly correlated with "*My job requires working very hard*". This resulted into forty-seven items with eight-factor structure.

Table 7.10 (overleaf) refers to the fit indices from the CFA on work stressors on the first randomly selected half of the data set. The fit indices are suggestive of a good model fit. This was validated on the second sample as shown in Table 7.11 (overleaf), in which the fit indices showed that the model fitted the data adequately. Based on these results, I calculated a composite score of *work stressors* based on the mean *standardized* scores of each dimension. I did this as the response formats across the measures were not the same.

Table 7.10: Fit Indices of Confirmatory Factor Analysis for WORK STRESSORS on the First Randomly Selected Half of the Data Set.

FIRST HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	10693.88	666			.161 (.159, .164)	16.06
Eight-factors (uncorrelated) [a]	2688.94	595	.79	.77	.078 (.075, .081)	4.52
One-factor [b]	6454.86	594	.46	.35	.131 (.128, .133)	10.69
Eight-factors(correlated)[c] **two items deleted**	1159.78	499	.92	.91	.052 (.048, .056)	2.32

Note. N=580 for half of the data set. *** *p<.001.*

Eight factors are psychological work demands, physical work demands, quantitative workload, and qualitative workload, constraints due to organisation, on-the-job constraints, interpersonal conflict, and move to new hospital.

[a] Difference eight- factor (uncorrelated) and null model: $\Delta\chi^2$ (df) = 8005.5(72)***

[b] Difference one-factor and eight- factor (uncorrelated): $\Delta\chi^2$ (df) = 3765.92(1)***

[c] Difference eight-factor (correlated) and one-factor : $\Delta\chi^2$ (df) =5295.08(95)***

Table 7.11: Fit Indices of Confirmatory Factor Analysis for WORK STRESSORS on the Second Randomly Selected Half of the Data Set.

SECOND HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	10287.28	666			.162 (.159, .164)	15.45
Eight-factors (uncorrelated) [a]	2522.74	595	.80	.78	.077 (.073, .080)	4.24
One-factor [b]	6643.79	594	.37	.30	.136 (.133, .139)	11.19
Eight-factors(correlated)[c] **two items deleted**	1141.67	499	.92	.91	.053 (.049, .057)	2.29

Note. N=580 for half of the data set. *** *p<.001.*

Eight factors are psychological work demands, physical work demands, quantitative workload, and qualitative workload, constraints due to organisation, on-the-job constraints, interpersonal conflict, and move to new hospital.

[a] Difference eight- factor (uncorrelated) and null model: $\Delta\chi^2$ (df) = 7764.54(72)***

[b] Difference one-factor and eight- factor (uncorrelated): $\Delta\chi^2$ (df) = 4121.05(1)***

[c] Difference eight-factor (correlated) and one-factor : $\Delta\chi^2$ (df) =5502.12(95)***

Table 7.12, overleaf, shows that for *work stressors*, the critical ratios for all the factor loadings are significant with $p< 0.01$, assuring item reliability. The construct reliability estimate is 0.99, but the average variance extracted is just below 0.5. Overall, there is sufficient construct reliability and validity, whereby I could proceed with further analysis using work stressors as a construct.

Table 7.12: Reliability and Validity of Work Stressors

Constructs	Items	Item Reliability				CR	VE±
		Factor Loading	SE	Standardised Loading	Critical Ratio		
		Work Stressors (Composite)					
Work Stressors	PsyD	1.00		0.79		0.99	0.40
	PhysD	0.58	0.030	0.57	19.47***		
	QW	0.59	0.029	0.58	20.03***		
	QualW	0.70	0.028	0.50	16.41***		
	Organisational Constraints	0.60	0.029	0.61	21.19***		
	On-the Job Constraints	0.41	0.028	0.44	14.06***		
	Interpersonal Conflict	0.70	0.029	0.69	25.00***		
	Organisational Change	0.50	0.028	0.54	18.00***		

***p<0.001

Reliability and Validity of Psychological Strain

Like nature of work and work stressors, psychological strain is a second-order factor designed specifically for this study. The aim is to create a composite measure of the construct after validation for further analysis. The reasons for justifying this latent construct are based on the same considerations as for "work stressors".

Construct Reliability and Validity of Psychological Strain

There are several indicators of psychological strain found in published research. Perhaps, the most common are job satisfaction and burnout. In this study, I have used job satisfaction, intention to leave job, and the three dimensions of burnout namely emotional exhaustion, depersonalization and reduced personal accomplishment as indicators of psychological strain, with the aim of computing a composite measure. Within this perspective, the operational definition of strain is as a negative perception. Therefore, job satisfaction and personal accomplishment were both reverse-coded to be in line with the negative perceptions achieved by the other three scales. I carried out individual level analysis to examine construct validity by means of confirmatory factor analysis *(CFA)* using AMOS version 6.0 (Arbuckle, 2006) on a randomly selected half of the data set.

Table 7.13: Fit Indices of Confirmatory Factor Analysis for Psychological Strain on the First Randomly Selected Half of the Data Set.

FIRST HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	6737.31	406			.164 (.161, .168)	16.59
Five-factors (uncorrelated) [a]	1473.45	351	.82	.80	.074 (.070, .078)	4.20
One-factor [b]	3671.453	327	.45	.36	.133(.129, .137)	11.23
Five-factors (correlated) [c]	1069.20	341	.89	.86	.061 (.057, .065)	3.14
Second order factor [d]	860.43	372	.89	.86	.074 (.069, .079)	4.20
Second order factor model with two covariances [e]	882.52	370	.91	.90	.052(.048, .056)	2.39

Note. N=567 for half of the data set. *** *p<.001;*
Second-order factor is *Psychological Strains*: Job dissatisfaction, intention to leave job, emotional exhaustion, depersonalisation, and personal accomplishment.

[a] Difference five- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 5263.86(55)***
[b] Difference one-factor and five- factor (uncorrelated): $\Delta\chi^2$ (df)= 2198.00(24)***
[c] Difference five-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=2602.25(14)***
[d] Difference second order factor and five-factor (correlated) model: $\Delta\chi^2$ (df)=208.77(31)***
[e] Difference second order factor model with covariances and second order factor model: $\Delta\chi^2$ (df)=22.09(2)***

Table 7.14: Fit Indices of Confirmatory Factor Analysis for Psychological Strain on the Second Randomly Selected Half of the Data Set.

SECOND HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	6890.04	378			.177 (.173, .180)	18.23
Five-factors (uncorrelated) [f]	1506.29	351	.81	.80	.083 (.078, .087)	4.29
One-factor [g]	3951.45	327	.44	.36	.142(.138, .146)	12.08
Five-factors (correlated) [h]	1235.81	341	.87	.84	.069 (.065, .073)	3.62
Second order factor [i]	1152.30	372	.88	.86	.066 (.062, .070)	3.10
Second order factor model with two covariances [j]	945.08	370	.91	.90	.057(.052, .061)	2.55

Note. N=567 for half of the data set. *** *p<.001;*
Second-order factor is *Psychological Strains*: Job dissatisfaction, intention to leave job, emotional exhaustion, depersonalisation, and personal accomplishment.
[f] Difference five- factor (uncorrelated) and null model: $\Delta\chi^2$ (df)= 5383.75(55)***
[g] Difference one-factor and five-factor (uncorrelated): $\Delta\chi^2$ (df)= 2445.16(24)***
[h] Difference five-factor (correlated) and one-factor : $\Delta\chi^2$ (df)=2715.64(14)***
[i] Difference second order factor and five-factor (correlated) model: $\Delta\chi^2$ (df)=83.51(31)***
[j] Difference second order factor model with three covariances and second order factor models: $\Delta\chi^2$ (df)=207.22(2)***

As Table 7.13 shows, *CFA* yielded reasonably acceptable RMSEA for both the second order factor models – with and without covariances between errors (Figure 7.2), which were included based on conceptual reasoning, and according to suggested modification indices. CFI is close to 0.9. I repeated *CFA* using the second half of the data set and yielded very similar results (Table 7.14).

Figure 7.2: Second Order Factor (Psychological Strain) Model with Covariances

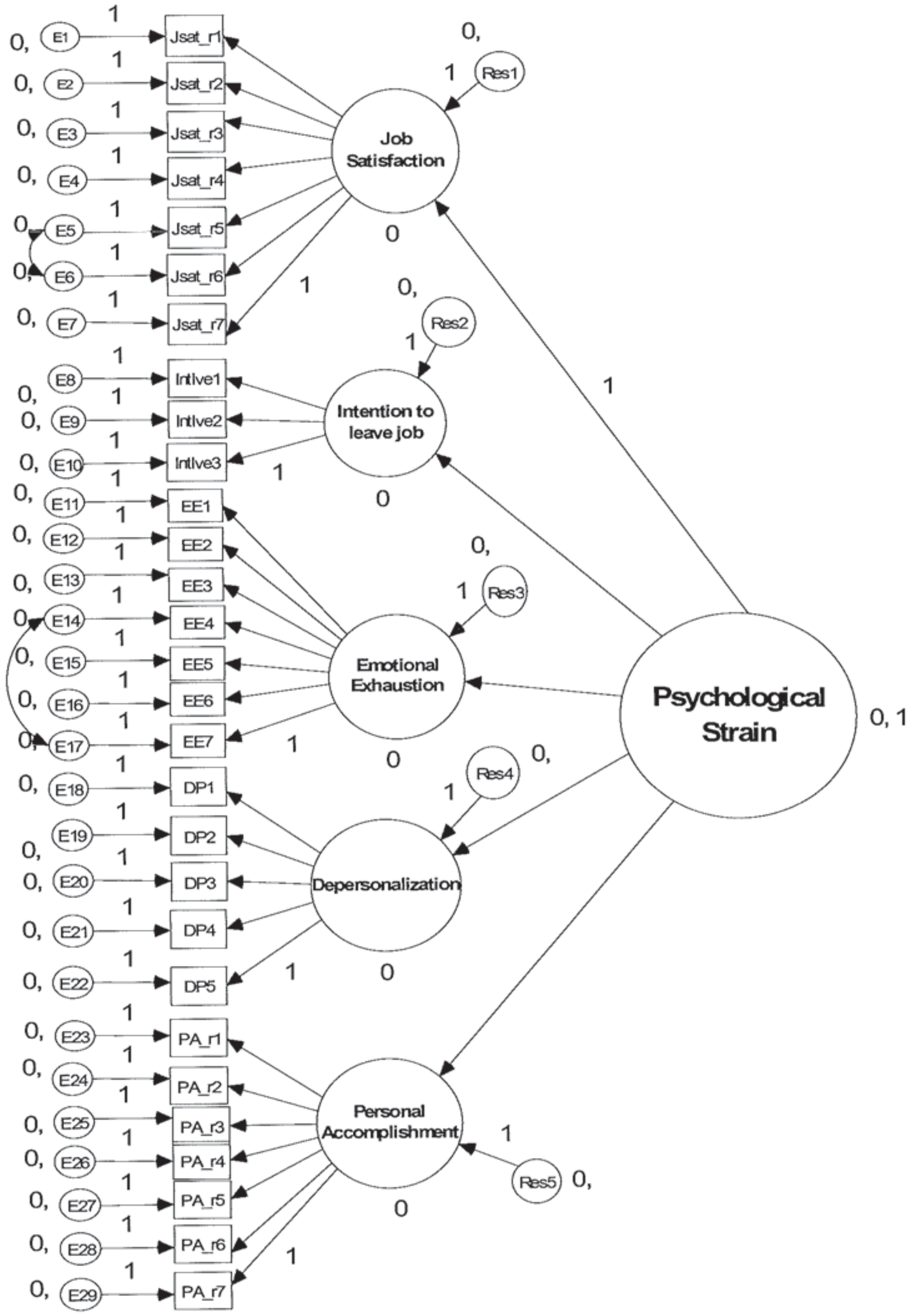


Table 7.15, shows that for *psychological strains*, the critical ratios for all the factor loadings are significant with $p < 0.01$, assuring item reliability. The construct reliability estimate range from 0.91 to 0.98, but the average variance extracted is just below 0.5. Overall, there is sufficient construct reliability and validity, whereby I could proceed with further analysis using work stressors as a construct.

Table 7.15: Reliability and Validity of Psychological Strains

	Psychological Strains (Composite)						
	Factor Loading		SE	Standardised Loading	Critical Ratio	CR	VE
Psychological Strains	Job Dissatisfaction	0.52	0.047	0.66	11.21***	0.98	0.40
	Intention to Leave Job	0.84	0.061	0.63	13.76***		
	Emotional Exhaustion	0.62	0.051	0.81	12.04***		
	Depersonalisation	0.25	0.035	0.64	6.98***		
	Personal Accomplishment	1.00		0.23			
Job Dis-Satisfaction	Jsat_r 1	1.00		0.74		0.98	0.40
	Jsat_r 2	0.81	0.057	0.65	14.23***		
	Jsat_r 3	0.39	0.046	0.38	8.40***		
	Jsat_r 4	1.02	0.092	0.50	11.06***		
	Jsat_r 5	0.96	0.061	0.72	15.60***		
	Jsat_r 6	0.63	0.049	0.59	12.78***		
	Jsat_r 7	0.81	0.055	0.74	14.81***		
Intention to Leave Job	Intlve 1	1.00		0.90		0.92	0.81
	Intlve 2	0.96	0.031	0.90	30.73***		
	Intlve 3	1.05	0.037	0.90	28.44***		
Emotional Exhaustion	EE 1	1.00		0.62		0.98	0.60
	EE 2	0.86	0.075	0.54	11.43***		
	EE 3	1.50	0.095	0.79	15.36***		
	EE 4	1.38	0.089	0.80	15.53***		
	EE 5	1.41	0.092	0.79	15.32***		
	EE 6	1.61	0.098	0.87	16.35***		
Depersonal-isation	DP 1	1.00		0.40		0.91	0.36
	DP 2	0.90	0.129	0.44	6.99***		
	DP 3	2.43	0.281	0.77	8.64***		
	DP 4	2.29	0.267	0.74	8.57***		
	DP 5	1.41	0.179	0.57	10.10***		
Personal Accomplish-ment	PA_r 1	1.00		0.56		0.96	0.30
	PA_r 2	1.16	0.112	0.64	10.33***		
	PA_r 3	1.16	0.115	0.61	10.10***		
	PA_r 4	0.75	0.099	0.41	7.61***		
	PA_r 5	1.04	0.115	0.52	9.06***		
	PA_r 6	0.95	0.105	0.51	9.01***		
	PA_r 7	0.86	0.103	0.46	8.34***		

Discriminant Validity of Psychological Strain

Psychological strain was assessed for discriminant validity by carrying out exploratory factor analysis using SPSS version 14.0, with items measuring psychological strain, physiological strain, and job engagement, namely physiological strain (*JCQ*), vigour, dedication, absorption (*job engagement*) and '*psychological strain*'. High discriminant validity was shown because the factor structure clearly differentiates '*psychological strain*' from other scales (Table 7.16). Furthermore, as shown in Table 7.16, and in line with the construct's five-factor structure, the '*psychological strain*' subscales, as expected, loaded on five different factors, thereby providing additional support to the confirmatory factor analysis of the construct. On a closer look at Table 7.16, there were no cross-loadings between factors, with the result that the nine factors were distinct. However, some items loaded on a different factor than the one denoted by their original scale. The only item which loaded on a different scale from its original was item 28 "*I feel very energetic*".

This loaded on the factor, which carried the items from *Vigor* of the *Utrecht Job Engagement Scale*. Within the constructs of the *Utrecht Job Engagement Scale*, (Schaufeli& Bakker, 2003) namely *Vigor, Dedication,* and *Absorption*, some items loaded on a different factor from the one found by the authors in their psychometric validation of the tool. For example, items 36, 37, and 38 in Table 7.16 that form part of the construct *Vigor* loaded on the factor that carried the items for '*Absorption*'. Similarly, items 40 and 41 originally part of '*Dedication*' loaded on the factor that carried the items for *Vigor* Overall, the construct *psychological strain* showed sufficient construct reliability and validity, and was used for further analysis.

Table 7.16: Pattern Matrix. Maximum Likelihood Analysis of Self-Report Data and Oblique Rotation (Higher Factor Loadings in Bold)

ITEMS	Psychological Strain					Physiological Strain	Job Engagement		
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
1. Reverse coded: The recognition I get for good work (Jobsat)	**-.656**	-.051	.041	.062	-.040	.016	.164	.040	-.145
2. Reverse coded: The support I get from my immediate supervisor (Jobsat)	**-.686**	-.022	-.024	.061	.014	-.028	.069	.010	-.232
3. Reverse coded: The freedom I have to choose my own method of working (Jobsat)	**-.652**	.032	-.118	.004	.010	-.033	-.088	-.097	.025
4. Reverse coded: The support I get from my work colleagues (Jobsat)	**-.385**	-.039	-.034	-.052	.108	.034	-.016	.055	.116
5. Reverse coded: The amount of responsibility I am given (Jobsat)	**-.678**	-.023	-.005	-.013	.015	.031	-.123	-.025	.150
6. Reverse coded: The opportunities I have to use my abilities (Jobsat)	**-.724**	-.032	-.014	-.058	.003	.062	-.103	-.092	.149
7. Reverse coded: The extent to which my employer values my work (Jobsat)	**-.644**	-.048	-.007	.081	-.116	-.006	.220	.048	-.176
8. I often think about leaving my current post (Intlve)	-.047	**-.814**	-.037	.018	-.001	.035	.005	.015	-.030
9. I will probably look for a new job in the next year (Intlve)	.067	**-.994**	.015	.004	.018	-.011	-.100	.030	-.022
10. As soon as I can find a new job, I will leave current employer (Intlve)	-.017	**-.920**	-.009	-.003	-.009	-.005	-.075	-.018	-.012
11. I feel emotionally drained from my work (EE)	-.087	-.126	**-.697**	.009	-.027	.042	.004	.007	-.011
12. I feel used up at the end of the workday (EE)	-.151	-.121	**-.689**	-.021	-.042	-.013	.069	.075	-.059
13. I feel fatigued when I get up in the morning and have to face another day on the job (EE)	-.101	-.065	**-.665**	-.005	-.044	.116	.186	-.061	-.075
14. Working with people all day is really a strain for me (EE)	.016	-.044	**-.515**	.262	.043	-.047	-.031	-.052	.150
15. I feel burned out from my work (EE)	-.078	-.121	**-.705**	.013	-.044	.061	.124	.012	.008
16. I feel frustrated by my job (EE)	-.233	-.241	-.253	.172	-.121	.112	.265	.133	.116
17. I feel I'm working too hard on my job (EE)	-.068	-.087	**-.529**	.112	-.099	.003	-.004	.103	-.077
18. Working with people directly puts too much stress on me (EE)	-.028	.045	**-.408**	.309	.010	.060	-.075	-.008	.125
19. I feel like I'm at the end of my rope (EE)	-.083	-.199	-.234	.173	-.139	.205	.173	.085	.150
20. I feel I treat some recipients as if they are impersonal objects (DP)	.012	-.053	-.109	**.540**	.091	.019	.036	.020	-.039

Abbreviations within brackets next to each item denotes original scale, of which specific item is part. (Jobsat): Job Satisfaction; (Intlve): Intention to leave job; (EE): Emotional Exhaustion; (DP): Depersonalisation; (PA): Personal Accomplishment; (PhysS): Physical Strain; (VI): Vigour; (DE): Dedication; (AB): Absorption.

(Continued Overleaf)

Table 7.16: Continued

ITEMS	Psychological Strain					Physiological Strain	Job Engagement		
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
21. I have become more insensitive towards people since I took up this job (DP)	-.022	-.046	.001	**.744**	-.013	.009	-.048	-.062	-.120
22. I worry that this job is hardening me emotionally (DP)	-.036	-.103	-.089	**.651**	.048	.041	-.029	.022	-.089
23. I don't really care what happens to some recipients (DP)	-.004	.011	.085	**.572**	-.031	-.025	.064	-.070	.115
24. I feel recipients blame me for some of their problems (DP)	-.034	.030	-.114	.298	.083	.102	-.005	.102	.238
25. Reverse coded: I can easily understand how my recipients feel about things (PA)	.026	.031	.291	.101	**.438**	-.038	.019	.059	-.012
26. Reverse coded: I deal very effectively with the problems of my recipients (PA)	-.063	.078	.128	.102	**.547**	.022	.036	.022	-.062
27. Reverse coded: I feel I am positively influencing other people (PA)	-.083	.024	-.020	-.089	**.470**	-.046	-.005	-.090	.132
28. Reverse coded: I feel very energetic (PA)	.002	.009	-.223	-.104	.191	.133	**.459**	-.067	-.049
29. Reverse coded: I can easily create a relaxed atmosphere with my recipients (PA)	.012	.000	-.096	.012	**.548**	.025	.002	-.108	-.040
30. Reverse coded: I feel exhilarated after working closely with my recipients (PA)	.001	-.047	.053	-.056	**.315**	-.001	.065	-.176	-.025
31. Reverse coded: I have accomplished many worthwhile things in this job (PA)	-.134	-.045	.018	-.069	**.390**	.011	.166	-.075	.212
32. Reverse coded: In my work, I deal with emotional problems very calmly (PA)	.085	-.080	-.060	.066	**.528**	.043	.068	.002	.056
33. At my work I feel bursting with energy (VI)	.020	.046	.082	.020	-.154	-.064	**-.429**	.068	.066
34. At my job, I feel strong and vigorous (VI)	.064	.024	.080	-.058	-.103	-.079	**-.598**	.129	-.033
35. When I get up in the morning, I feel like going to work (VI)	.050	.121	.096	-.096	.083	.000	**-.452**	.351	-.009
36. I can continue working for long periods at a time (VI)	.050	-.047	.050	-.001	-.117	-.101	-.022	**.653**	.066
37. At my job, I am very resilient, mentally (VI)	.020	-.002	.117	-.023	-.157	-.026	.061	**.617**	.038

Abbreviations within brackets next to each item denotes original scale, of which specific item is part. (Jobsat): Job Satisfaction; (Intlve): Intention to leave job; (EE): Emotional Exhaustion; (DP): Depersonalisation; (PA): Personal Accomplishment; (PhysS): Physical Strain; (VI): Vigour; (DE): Dedication; (AB): Absorption.

(Continued Overleaf)

Table 7.16: Continued

ITEMS	Psychological Strain					Physiological Strain	Job Engagement		
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
38. At my work I always persevere, even when things do not go well (VI)	-.051	.000	.082	-.097	-.288	-.035	.072	**.551**	.110
39. I find the work that I do full of meaning and purpose (DE)	.055	.103	-.086	-.129	-.283	-.024	**-.395**	-.034	-.332
40. I am enthusiastic about my job (DE)	.127	.143	.044	-.033	-.035	.013	**-.523**	.184	-.230
41. My job inspires me (DE)	.129	.099	.006	-.004	-.026	.017	**-.404**	.246	-.298
42. I am proud of the work that I do (DE)	.004	.179	-.086	-.105	-.129	-.031	-.236	.224	-.416
43. To me my job is challenging (DE)	.091	.091	-.085	.091	-.069	-.084	-.142	.374	-.435
44. Time flies when I'm working (AB)	.128	.076	-.135	-.072	-.089	-.043	**-.304**	.221	-.049
45. When I'm working, I forget everything else around me (AB)	.026	.020	-.040	-.004	-.041	.023	-.242	**.375**	-.016
46. I feel happy when I am working intensely (AB)	.049	.039	.081	-.104	.087	.007	-.334	**.421**	-.073
47. I am immersed in my work (AB)	.044	.044	-.204	-.143	.053	-.067	-.020	**.622**	-.169
48. I get carried away when I'm working (AB)	.066	.038	-.069	.023	.061	.004	-.067	**.697**	-.108
49. It is difficult to detach myself from my job (AB)	-.022	.038	-.057	.056	.042	.094	-.112	**.553**	-.015
50. How often do you become tired in a very short period of time? (PhysS)	.090	-.002	-.233	.006	.046	**.368**	.183	-.061	-.024
51. Do you have trouble with sweaty hands which feel damp and clammy? (PhysS)	-.048	.065	-.047	.153	.008	**.305**	-.051	-.054	.080
52. Do you have trouble with feeling nervous, fidgety or tense? (PhysS)	.015	-.036	-.143	.082	-.016	**.474**	.020	-.029	.081
53. Do you have trouble with poor appetite? (PhysS)	.004	-.026	.035	.080	.063	**.470**	-.030	.038	.038
54. Do you have trouble getting to sleep? (PhysS)	-.021	-.012	.065	-.099	-.063	**.825**	-.024	.025	-.077
55. Do you have trouble staying asleep? (PhysS)	-.015	-.045	.097	-.111	-.040	**.748**	.033	-.008	-.072

Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization. [a] Rotation converged in 20 iterations.

Abbreviations within brackets next to each item denotes original scale, of which specific item is part. (Jobsat): Job Satisfaction; (Intlve): Intention to leave job; (EE): Emotional Exhaustion; (DP): Depersonalisation; (PA): Personal Accomplishment; (PhysS): Physical Strain; (VI): Vigour; (DE): Dedication; (AB): Absorption.

Therefore, I calculated a composite score based on the mean *standardized* scores of each dimension, since the response formats across the measures were not the same.

Reliability and Validity of Unit Performance

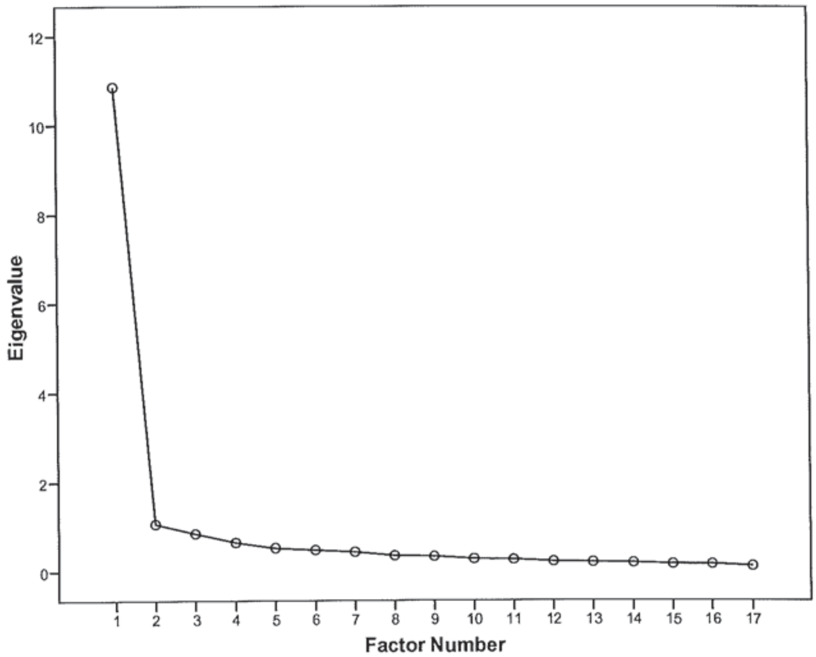
Table 7.17 shows the descriptive statistics of the individual items that make up the scales of unit performance.

Table 7.17: Descriptive statistics of external raters' items on unit performance

Scale	Item No	Items	N	Min	Max	Mean	SD
Unit performance	Q1	Effectively provides patients and relatives with information on hospital services	274	1	5	3.60	1.064
	Q2	Effectively provides patients and relatives with information on how the ward/unit functions	274	1	5	3.51	1.073
	Q3	Effectively provides patients and relatives with information on the medical condition that required admission	270	1	5	3.65	1.178
	Q4	Effectively implements procedures for dealing with patients' questions, comments, suggestions and complaints	274	1	5	3.32	1.122
	Q5	Effectively maintains clinical competence in line with current patient needs	274	1	5	3.94	.993
	Q6	Effectively audits the clinical practice of the unit/ward	274	1	5	2.96	1.235
	Q7	Effectively sets protocols which are agreed and implemented by members of staff in the unit/ward	274	1	5	3.21	1.185
	Q8	Shows effective commitment to the personal and professional development of all members of staff in the unit/ward	274	1	5	3.59	1.077
	Q9	Members of staff understand and value the roles and responsibilities of fellow members of staff	274	1	5	3.74	.881
	Q10	Effectively implements a clear strategy for communication (e.g. regular meetings, message system, frequent face-to-face sharing of information)	274	1	5	3.27	1.106
	Q11	Effectively profiles the unit/ward patients' needs	274	1	5	3.23	1.034
	Q12	Effectively reviews and adjusts skill mix in accordance with the identified unit/ward patients' needs	274	1	5	3.40	1.014
	Q13	Effectively collaborates with the management of the hospital	274	1	5	3.86	.976
	Q14	Effectively collaborates with other departments, units and wards in the hospital	274	1	5	3.81	1.041
	Q15	Makes effective use of the resources allocated to it	274	1	5	3.90	1.040
	Q16	Effectively implements good practice recommendations that are issued by the Department of Health or hospital management	272	1	5	3.95	.943
	Q17	Effectively concentrates on the achievement of optimal patient outcomes	274	1	5	4.03	1.052

Using split-sample analysis, the seventeen items of unit performance were subjected to an exploratory factor analysis using Maximum Likelihood Analysis (MLA) on half of the randomly selected data set and using SPSS version 14.0. In exploratory factor analysis, no structure is pre-specified. Prior to performing MLA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of some coefficients of 0.3 and above. The Kaiser-Meyer-Oklin value was 0.94, exceeding the recommended value of 0.6 (Pallant, 2005) and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix. Maximum Likelihood analysis revealed the presence of two factors with eigenvalues exceeding one. However, the first explains 63.2% of the variance whereas the second only explains 7.9%. Inspection of the Scree plot (Figure 7.3) also revealed a strong single factor with no break between the second and the third.

Figure 7.3: Scree Plot for Hospital Unit Performance



I then carried out confirmatory factor analysis *(CFA)* using AMOS version 6.0 (Arbuckle, 2006) on a randomly selected half of the data set. As Table 7.18 shows, *CFA* yielded reasonably acceptable results for χ^2 /df, CFI, and TLI indices but not for RMSEA. The model fit indices improved with the additional covariances between errors, which were included based on conceptual reasoning and in accordance with suggested modification indices. The modifications required were most likely specific to the study sample. Based on these results as well as on psychometric validation from previous studies, I decided not to eliminate any items. The scale had a high level of internal consistency with a Cronbach's coefficient alpha of 0.97. Therefore, overall, I considered unit performance a reasonably reliable and valid scale, such that a mean scale score was composed from the seventeen items.

Table 7.18: Fit Indices of Confirmatory Factor Analysis for Unit Performance on the Second Randomly Selected Half of the Data Set.

SECOND HALF OF DATA SET	χ^2	*df*	CFI	TLI Rho2	RMSEA (LO 90, HI 90)	Chi-square/df
Null model	2091.11	153			.302 (.313, .290)	13.67
One-factor [a]	405.37	120	.85	.81	.131(.145, .117)	3.38
One-factor with five covariances between errors[b]	262.95	115	.93	.90	.096 (.112, .081)	2.29

Note. N=140 for half of the data set. ****p<.001;*

[a] Difference one- factor and null models: $\Delta\chi^2$ (df)= 1685.74(33)***

[b] Difference one-factor with five error covariances and one-factor: $\Delta\chi^2$ (df)= 142.42(5)***

Table 7.19 shows that for *unit performance*, the critical ratios for all the factor loadings are significant with $p < 0.01$, assuring item reliability. The construct reliability estimate range is 0.99 and the average variance extracted is just below 0.65.

Table 7.19: Reliability and Validity of Unit Performance

Constructs	Items	Item Reliability				CR	VE±
		Factor Loading	SE	Standardised Loading	Critical Ratio		
		Unit Performance					
Unit Performance	Q 1	1.00		0.82		0.99	0.65
	Q 2	0.89	0.069	0.81	12.84***		
	Q 3	1.04	0.078	0.83	13.41***		
	Q 4	0.86	0.064	0.83	13.53***		
	Q 5	1.02	0.086	0.77	11.88***		
	Q 6	0.83	0.073	0.76	11.43***		
	Q 7	0.93	0.070	0.82	13.31***		
	Q 8	0.80	0.069	0.76	11.56***		
	Q 9	0.75	0.062	0.78	12.18***		
	Q 10	0.95	0.069	0.83	13.81***		
	Q 11	0.94	0.069	0.83	13.61***		
	Q 12	0.95	0.075	0.80	12.58***		
	Q 13	0.67	0.058	0.76	11.63***		
	Q 14	0.94	0.067	0.84	13.90***		
	Q 15	0.99	0.077	0.80	12.84***		
	Q 16	0.81	0.060	0.83	13.47***		
	Q 17	0.94	0.068	0.84	13.86***		

*** $p<0.001$.

Overall, there is sufficient construct reliability and validity, whereby I could proceed with further analysis using unit performance as a construct.

7.4 Assessing Multivariate Normality of the Variables in the Study

Some of the multivariate procedures and most statistical techniques assume multivariate normality. The assumptions underlying multivariate normality are that each variable and all the linear combinations of the variables are normally distributed (Hair et al., 2006; Tabachnick & Fidell, 2001). A normal distribution of data is illustrated by means of a symmetrical, bell-shaped curve, with the greatest frequency of scores in the middle and smaller frequencies towards the extreme ends. Apart from the histogram, normality curve, detrended normal Q-Q plots, I also assessed the variable scores for skewness and kurtosis. When there is multivariate normality, the residuals (the errors between predicted and obtained scores) are also normally distributed.

The assumption of multivariate normality can be checked by examining normality, linearity, and homoscedasticity (Tabachnick & Fidell, 2001). The majority of the variables in the study satisfied these assumptions, except for the negatively skewed interpersonal conflict at work and depersonalisation, which required logarithmic transformations.

7.5 Checking Data for Non-Independence of Observations – Intraclass Correlations and Within-group Reliability of Grouped Data

In this section, I will examine intraclass correlations and within-group reliability indices of the variables in the study, which will allow me to formulate the analysis strategy for hypotheses testing.

7.5.1 The Consequences of Treating Grouped Data as Though They Were Independent

Bliese and Hanges (2004) built a strong argument in favour of avoiding treating grouped data as if they were independent. Traditional statistical techniques such as regression and ANOVA assume independence of responses and observations, randomly sampled from a population. Indeed, these authors claim that unaccounted-for non-independence affects standard error or variance estimates which, in turn, affect statistical significance results.

Therefore, Bliese and Hanges recommend that *multilevel modelling techniques*, such as random coefficient modelling, should be used, not only for testing hypotheses involving higher level variables, but also *to test relationships among lower level variables that are influenced by group membership.* Indeed, they show that ignoring non-independence when modelling only lower level variables reduces power of statistical tests and increases Type II errors. Furthermore, Bliese and Jex (1999) were among the first to argue in favour of incorporating a multilevel analysis perspective in occupational stress research that focused for so long and almost exclusively on the individual level of analysis.

In this multilevel study, I collected individual-level data by means of a survey and at unit-level by means of external ratings. The data from health care employees, inherently nested within units, showed some degree of non-independence due to group membership as will be shown in the following results. As discussed earlier, hypothesised relations in this study exist at *and* across multiple levels.

In the hypothesised relationships in this study, three constructs are intended at the higher level, namely transformational leadership, team climate, and unit performance.

Except for unit performance, captured directly at unit level, all the other measurements were at the individual level.

7.5.2 Aggregation of Lower-level Data to Higher-Level Constructs

Bar-Tal (1990) identified four requirements for effective unit-level data collection and analysis: (1) the construct represents the unit as a whole, (2) there is significant within-unit agreement, (3) the construct differentiates between units, and (4) the assessment of the construct reflects the interactions that occur within the unit. Aggregating individual-level data to unit level satisfies Bar-Tal's first three requirements, but not the fourth requirement, as team members fill in questionnaires on their own thereby missing the unit/team's collective history. Indeed, this study incorporated external ratings of unit performance that reflected the interactions occurring among the hospital employees within their unit.

Transformational leadership and team climate are higher-level constructs with shared unit properties (Klein et al., 2000) meaning they originate at the individual level but are manifest at the unit level. The theoretical justification for specifying leadership as a unit level construct is that leaders exhibit behaviours that influence their followers who, within the same unit, and under the same leader, tend to react similarly to these behaviours. Therefore, the lower-level data are sufficiently homogenous within units to meaningfully justify aggregation to unit level (Klein et al., 2000).

The same logic applies to team climate, whereby team members tend to react similarly to the team context and structure in which they find themselves. Indeed, team climate is a unit-level construct with shared unit properties emerging from the characteristics, behaviours, and cognitions of unit members and their interactions. Both transformational leadership and team climate represent phenomena that span two levels (unit and individual) and an emergence that is compositional (Hofmann, 2002).

Despite the fact that as shared constructs, researchers often assume structural and functional equivalence (isomorphism) across levels; Bliese (2000) argues that true isomorphism rarely exists. For example, for team climate there is a distinction between individual standards and group norms. In fact, Bliese refers to this composition as *fuzzy* to reflect that even though the individual and aggregated unit-level constructs are linked, they are not *mirror images* of each other.

The three psychometric issues that I considered to examine multilevel data are within-group agreement, non-independence, and reliability (Bliese, 2000). Within-group agreement is the degree to which responses from individuals within the same units are interchangeable. It is measured by $R_{wg(j)}$ (James et al., 1984; 1993) which tests whether within-group agreement is uniform across all the units in the sample. $R_{wg(j)}$ provides statistical justification for aggregating individual-level perceptions of transformational leadership and team climate to unit level with values above 0.70 suggestive of acceptable within-group reliability (Nunnally & Bernstein, 1994).

Non-independence is the degree to which responses from individuals in the same unit are influenced by *or* depend on *or* cluster by group. Non-independence is measured by intraclass correlation *ICC(1)*, which is the proportion of total variance that can be explained by group membership (Bryk & Raudenbush, 1992). Reliability is an index of the relative consistency of responses among individuals and is measured by both types of intraclass correlations *ICC(1)* and *ICC(2)*. *ICC(1)* is a measure of reliability, when calculated on the predictor variable to justify aggregation to unit level. Additionally, it is a measure of non-independence to check whether the outcome or predicted variable is influenced by group membership (Bliese, 2000). *ICC (2)* is an estimate of the reliability of the group means.

The intraclass correlations assess within-unit homogeneity by comparing between-group variance to the total variance across the entire sample of units. In doing so, they demonstrate that the constructs vary across units (Yamarino & Markham, 1992). For all the variables in the study, I calculated the intraclass correlations from one-way random-effects ANOVA, where the variable of interest is the dependent variable and the unit membership is the independent variable (Bliese, 2000). An *ICC(1)* index that has *F*-ratios from an ANOVA greater than one provides the minimum evidence for differences across units with aggregation justified on achieving statistically significant *F*-ratios (Klein et al., 2000).

Justification for aggregation, however, also depends on *ICC(2)*. Values equal to or above .70 are acceptable; values between .5 and .7 are marginal; whereas values below .50 are poor (Klein et al., 2000). Table 7.20 shows within-group agreement and intraclass correlations for total scores of transformational leadership and team climate as well as their respective dimensions. These variables, backed by theoretical justification of possessing unit-level properties, require these indices as statistical justification for aggregation.

Table 7.20 shows that the average $R_{wg\ (j)}$ indices are above the rule of thumb value of 0.7, thereby showing sufficient within-group reliability. With regard to *F*-ratios of *ICC(1),* these are all above one, and are all statistically significant.

Table 7.20: Indices of Non-Independence, Relaibility, and Agreement for Transformational Leadership and Team Climate

VARIABLES (From Individual-level Data)	$R_{wg\,(j)}$	*ICC2*	*ICC1*	*F-value*
1. Total Mean Score Transformational Leadership	.99	.75	.27	3.97*
a. Vision	.75	.72	.24	3.52*
b. Inspiritational Communication	.70	.78	.30	4.47*
c. Intellectual Stimulation	.76	.61	.16	2.54*
d. Supportive Leadership	.76	.70	.22	3.24*
e. Personal Recognition	.67	.63	.17	2.68*
2. Total Mean Score Team Climate	.82	.52	.14	2.09*
a. Team Participation	.90	.52	.13	2.06*
b. Team Support for New Ideas	.93	.56	.15	2.27*
c. Team Objectives	.82	.40	.09	1.65*
d. Team Task Style	.76	.40	.09	1.65*
N= 1,137 individuals nested in 136 units *** p<0.0001 ** p=0.002 *** p=0.010**				

The grey highlighted figures are below the acceptable cut-off point.

Additionally, in order to achieve acceptable $R_{wg\,(j)}$ indices and significant *F*-ratios of *ICC(1)*, transformational leadership and its five dimensions have an *ICC(2)* of greater or close to .70. Therefore, total transformational leadership and its five dimensions separately show sufficient within-group agreement and sufficient between-group variability to justify aggregating the variables to unit level.

With regard to team climate, despite achieving acceptable $R_{wg\,(j)}$ indices and significant *F*-ratios of *ICC(1)*, *ICC(2)* values are less convincing. The total mean score for team climate, participation, and support for new ideas achieved a marginal *ICC(2)* value of more than .50. On the other hand, team objectives and team task orientation showed a poor *ICC(2)* value of .40. The marginal results for ICC(2) mean that the research instruments lack some degree of reliability and therefore power. However, failure of the two team climate dimensions from reaching an acceptable ICC(2) may be due to the influence of both the number and size of the units in the sample (Klein et al., 2000). Size variations as well as small units can artificially result in low unit variance (George

& James, 1993; Kirkman, Tesluk, & Rosen, 2001). Furthermore, all the units form part of the same organisation and follow the same political, strategic, and practice guidelines. Therefore, with regard to clarity of objectives and task style, ICC(2) values of less than 0.5 suggest a lack of between-unit variability. Based on the above arguments, and backed by strong theory and previous research, aggregation of team climate and its dimensions to unit level is justified (Klein et al., 2000).

7.5.3 Non-Independence of Grouped Data

Table 7.21 shows the within-group reliability and intraclass correlations for social support, decision latitude/control, as well as for work stressors and strains

Table 7.21: Indices of Non-Independence, Reliability, and Agreement for the Moderator Variables, Stressors, and Strains.

VARIABLES (From Individual-level Data)	$R_{wg(j)}$	*ICC2*	*ICC1*	*F-value*
Moderator Variables				
1. Total Social Support				
a. Supervisor Support	.93	.71	.24	3.44*
b. Co-worker Support	.94	.61	.16	2.54*
2. Decision Latitude/Control	.96	.60	.16	2.53*
Work Stressor-to-Strain Variables				
3. Organizational Constraints	.90	.69	.22	3.23*
4. Interpersonal Conflict at Work	.85	.47	.10	1.87*
5. Job Satisfaction	.92	.59	.15	2.46*
6. Work Demands	.93	.81	.33	5.20*
7. Incidents at Work	.92	.66	.19	2.89*
8. Quantitative Workload	.88	.73	.25	3.65*
9. Qualitative Workload	.79	.54	.13	2.21*
10. Intention to Leave Job	.74	.51	.11	2.12*
11. Emotional Exhaustion	.89	.55	.13	2.20*
12. Depersonalization	.90	.41	.08	1.79*
13. Personal Accomplishment	.94	.46	.10	1.86*
14. Total Physical Symptoms	.01	.26	.04	1.34
15. Move to New Hospital	.78	.31	.05	1.44*
16. Composite Nature of Work	.96	.83	.37	5.76*
17. Composite Work Stressors	.97	.72	.25	3.62*
18. Composite Psychological Strain	.87	.58	.14	2.35*

N= 1,137 individuals nested in 136 units *** p<0.0001 ** p=0.002 *** p=0.010**

The grey highlighted figures are below the acceptable cut-off point.

With regard to the moderators namely, social support and decision latitude/control, $R_{wg\ (j)}$ and intraclass correlations are suggestive of group-level effects. The *ICC(2)* values of the moderator variables are close to the acceptable 0.7 mark.

For work stressors and strains, I also needed to check for the effects of group membership, even though the constructs were intended at individual level. This is in line with the arguments by Bliese and Hanges (2004) to factor in non-independence of grouped data. Table 7.21 illustrates that, with the exception of *total physical symptoms,* the variables involved in the work stressor-to-strain relationships show sufficient within-group agreement based on the $R_{wg\ (j)}$ values being above the 0.7 cut-off point. This provides a clear indication of the influence of unit membership. Furthermore, again with the exception of *total physical symptoms*, the *F*-ratios of *ICC(1)* are all above one, and statistically significant. With regard to the other variables, the fact that some of the *ICC(2)* values are below the 0.5 cut-off point shows insufficient between-unit variability, which however is not required as these variables were intended for individual-level relationships.

In conclusion, these indices justify employing multilevel techniques in analysing the data in this study due to strong indications of the effects of unit membership on hierarchically nested data.

7.5.4 Unit Performance

Although this study did not use a consensus method among team members that would have satisfied Bar-Tal's fourth requirement (1990), it adopted external ratings of unit performance by having multiple raters, rating different units. Despite the fact that aggregation of individual-level data remains the most popular and practical method used among researchers, Campion et al. (1993) called for consideration of other methods other than aggregation to assess unit-level phenomena.

In this study, unit performance is a global construct. Conceptually, it defines the performance of the whole unit as an outcome measure which, however, can be attributed to the combined contributions of the diverse group of health care professionals within the unit. It does not emerge from the individual-level perceptions within the unit but captured by people external to the unit. The items (Appendix 9) refer to the units as a whole and do not refer to the individual members of the units. Additionally, due to the cross-sectional nature of the study presented in this thesis, reciprocal links of unit performance with work stressors cannot be excluded. Indeed, this reciprocal relationship of unit performance influencing work stressors at the individual level has been reported in earlier studies (Koslowsky, 1998).

Table 7.22 shows interrater reliability based on the one hundred and fourteen units that were each rated by two raters. $R_{wg(j)}$ for unit performance was .98, well above 0.70, suggestive of acceptable interrater agreement (Nunnally & Bernstein, 1994; Klein et al., 2000).

Table 7.22:
$R_{wg(j)}$ and ICC (2,k) for Unit Performance

VARIABLE Unit-Level	$R_{wg(j)}$	*ICC(2,k)*
Unit Performance	.98	.59
N=114 units, each rated by two external raters.		

The type of intraclass correlation (McGraw & Wong, 1996) that takes into consideration multiple raters for each measure is *ICC(2,k)*, which is a two-way random-effects ANOVA measure involving the units and raters as the two random effects. This achieved a marginal reliability by means of *ICC(2,k)* of .59 (Klein et al., 2000). Therefore, unit performance, as assessed by multiple raters, achieved acceptable interrater agreement, reliability, and between-group variance justifying multilevel analyses.

7.5.5 Concluding Remarks from the Assessment of the Indices of Within-group Agreement and Intraclass Correlations

In conclusion, the indices for within-group agreement and intraclass correlations provided us with three considerations. First, based on strong theoretical considerations, as well as on the above indices, I could aggregate transformational leadership and team climate variables to unit-level. Secondly, unit performance showed good reliability and validity as a measure. Thirdly, the indices of within-group agreement and intraclass correlations for the other variables alerted me of the influence of unit membership and therefore, of the violation of the assumption of independence of observations (Hox, 2002). Therefore, the process of checking the multilevel data assisted me in formulating an empirically more appropriate analysis strategy, whose aim was to have the best possible statistically valid results. In the next section, I will discuss the analysis strategy for hypotheses testing using multilevel techniques.

7.6 Analysis Strategy

In study two, I purposefully collected surveys from individuals in organisationally defined clusters (the hospital units) resulting in hierarchically structured data also referred to as complex survey data. More specifically, I considered hospital employees nested within their unit. Such hierarchical structures rendered the use of traditional statistical techniques, namely standard ordinary least squares regression models which are problematic for hypotheses testing (Bliese & Hanges, 2004) because of violation of the assumption of independence of observations. This violation occurred because hospital employees shared values at the unit level. One may think of applying two less than optimal analysis strategies rather than go for multilevel techniques. The first option is to ignore the assumption of non-independence at the individual level and estimate ordinary least squares regression models on the individual-level variables. This option results in underestimated standard errors for the regression coefficients and thus increases the likelihood of type I errors. The second option is to aggregate all individual-level variables to the unit or organizational level, irrespective of any theoretical and empirical justification for aggregation, with loss of potentially valuable individual information and loss of power (Raudenbush & Bryk, 2002). Furthermore, failure to recognize unit membership in hypothesized relationships among individual-level variables results in type II errors (Bliese & Hanges, 2004).

Therefore, any analysis strategy proposed should consider theoretically- and empirically-justifiable unit-level variables as distinct from individual-level variables within the context of the organization, without loosing power. Moreover, by distinguishing between levels of analysis, and acknowledging unit membership, the strategy should factor in non-independence of observations irrespective of the level at which the hypothesized relationships are. Often referred to as random coefficient models, or hierarchical models, multilevel models provide the flexibility and analytical properties to analyze complex data structures. For this study, I used two multilevel statistical programmes for hypotheses testing namely, hierarchical linear modelling - HLM version 6.03 (Raudenbush & Bryk, 2004 and Statistical Modelling Programme for Analyses with Latent Variables – Mplus version 4.2 (Muthén & Muthén, 2006).

7.6.1 Hierarchical Linear Models

Hierarchical linear models (HLM) incorporate data from multiple levels in an attempt to determine the impact of individual and grouping factors upon individual level outcome. These models are specifically designed to overcome the problems encountered with the aggregated and disaggregated options (Hofmann, Griffin, & Gavin, 2000). Hierarchical linear models, in contrast to ordinary least squares, account for dependency of error occurring because of individual-level data nested within higher-level units (Raudenbush & Bryk, 2002).

The Assumptions of Hierarchical Linear Modelling

There are a number of methodological and statistical assumptions on which hierarchical linear models are based (Hofmann, Griffin, & Gavin, 2000).

The four methodological assumptions are:

- Lower-level units are nested within identifiable higher-level units.
- Lower-level units are exposed to, and influenced by, higher-level unit's characteristics and processes.
- Outcome variable is measured at the lower level of interest of the researcher.

  This assumption renders the use of HLM problematic for considering unit performance as higher-level outcome. Hence, I will discuss the need to use Mplus® later on in this chapter.
- Outcome variable varies both within lower-level as well as between higher-level units.

The five statistical assumptions (Hofmann, Griffin, & Gavin, 2000; Raudenbush & Bryk, 2002) for two-level models are:

- Level-one residuals are independent and normally distributed with a mean of zero and variance σ^2 for every level one unit within each level two unit.
- Level-one predictors are independent of level-one residuals.
- Random errors at level two are multivariate normal with a constant variance and covariance ($\tau_{qq'}$, or tau).
- The set of level-two predictors is independent of every level-two residual.
- Residuals at level one and level two are independent.

In this study, I found that data from health care employees were nested within the context of hospital units, with the result that the values obtained from each employee were dependent upon the contextual environment of the hospital unit.

In the first stage, or individual-level of analysis, relationships among level-one variables are estimated separately, so that for each higher-level unit, the individual level predicted variables are regressed on the individual-level predictor variables (Hofmann, Griffin & Gavin, 2000). The result of the first stage is that intercept and slope coefficients, normally estimated using ordinary least squares analysis, are estimated separately for each unit and vary as a result of unit membership.

The Equations of Hierarchical Linear Modelling

The equation for *the level-one model* with one predictor (X_{ij}) is:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + r_{ij} \tag{7.1}$$

Each individual's score on the predicted variable (Y_{ij}) in unit j (j = 1…j units) is a function of individual characteristics (X_{ij}). Additionally, β_{0j} is the level one intercept whereas β_{1j} is the level-one slope coefficient for each group (fixed effects). r_{ij} represents random individual error associated with individual i. Therefore, level one of the Hierarchical Linear Model still recognises unit membership and consequently, it factors in independence of observations. Specific to this study, the moderator hypotheses will be modelled at this level, primarily because the relationships are intended to occur within units, but also recognising the effects of unit membership.

Hierarchical linear models assume that each unit has a unique intercept and slope coefficient. In the second stage, the level one parameters β_{0j} and β_{1j} are the dependent variables for analysis at level two. Apart from the required theoretical background of unit-level properties, between-group variability provides the empirical evidence to propose and develop models that will more accurately predict β_{0j}, and β_{1j}. Specific to this study, *a level-two model* can be developed using characteristics of the hospital unit as unit-effect (e.g. unit size, transformational leadership, team climate) to predict the individual-level model regression coefficients. The equations for *the level-two model* with one unit-level predictor, (W_j) and a randomly varying intercept (β_{0j}) and slope coefficient (β_{1j}) are:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j} \tag{7.2}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_j + u_{1j} \tag{7.3}$$

$$\beta_{1j} = \gamma_{10} \tag{7.4}$$

Equation 7.2 models the effect of each unit j on the unit mean score of the outcome (Y), while holding the unit effect W_j constant with u_{0j} representing the unique random effect of unit j. γ_{00} and γ_{01} represent the level-two intercept and slope terms.

Equation 7.2 represents *the main-effects model* (Hofmann, Griffin & Gavin, 2000), and on which are modelled this study's hypothesised relationships between unit-level *transformational leadership* and *team climate*, and average unit members' *social support* and *decision latitude/control.* Furthermore, by using this equation, I will control for unit size across the full set of hypothesised relationships modelled using HLM.

Equation 7.3 represents a randomly varying effect of unit j on the unit slope coefficient, while holding the unit effect W_j constant. γ_{10} and γ_{11} are the level-two intercept and slope terms respectively, whereas u_{1j} is the level-two residual of unit j. Hox (2002) further clarified that the residual error term u_{1j} is different for different values of the level one explanatory variable, which in ordinary multiple regression terms would be referred to as *heteroscedasticity.* Therefore, using ordinary multiple regressions would violate yet another assumption namely, that of *homoscedacticity*, which means that the variance of the residual errors is independent from the values of the explanatory variable. Therefore, on the basis of these violations of assumptions of ordinary least squares, ordinary multiple regressions do not work well and should be replaced by multilevel techniques. In this study, the moderator variables are modelled at level one, on equation 7.1. Therefore, these models are referred to as random coefficients regression models, which are unconditional at level-two, but which allow all level-one coefficients to vary randomly (Raudenbush & Bryk, 2002).

Finally, equation 7.4 represents the slope (β_{1j}) with a fixed effect, so much so that only the intercept (average score across the units on the dependent variable) of the level-one model is assumed to vary at the group-level. For every predictor introduced in the equation at level one, there will be the respective equation representing the slope with a fixed effect, at level two.

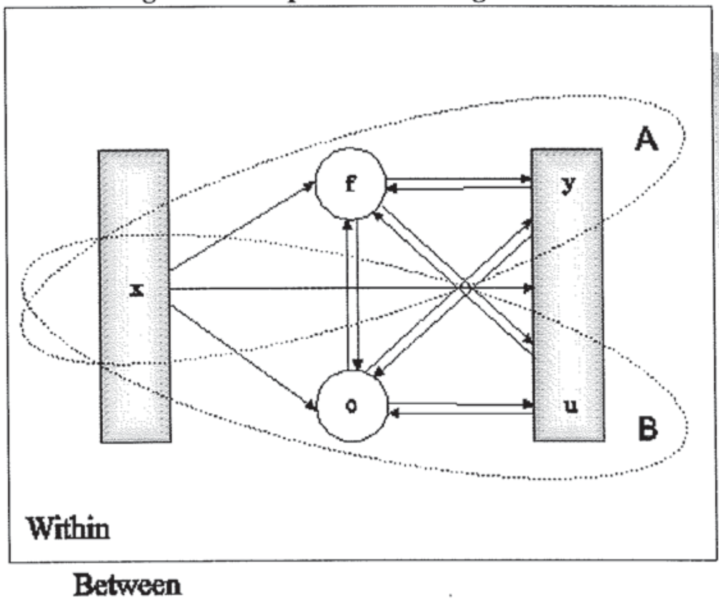
7.6.2 Mplus®

One of the methodological assumptions underlying hierarchical liner modelling is that the outcome variable is modelled at the lower level of analysis. Therefore, HLM is not the appropriate analytic tool to assess the extent to which individual-level characteristics influence or predict aggregate or higher-level phenomena (Hofmann, Griffin & Gavin, 2000).

Indeed, the hypothesized relationships in this study involve unit performance measured through external ratings, as a higher-level outcome variable. Hence, the need to use Mplus®. Mplus® is a statistical modelling program that provides researchers with a more flexible tool to analyze complex survey data and multilevel data.

The Mplus® Modelling Framework (Figure 7.4) shows the types of relationships that can be modelled in Mplus®. The *Within* and *Between* parts of the figure indicate that multilevel models that describe the within and between variation can be estimated using Mplus®. I also used Mplus® as a multilevel structural equation modelling tool to test the models in the study.

Figure 7.4: Mplus® Modelling Framework



Note: The arrows in the figure represent regression relationships between variables. The rectangles represent observed variables. Observed variables can be outcome variables or background variables. Background variables are referred to as **x**; continuous and censored outcome variables are referred to as **y**; and binary, ordered categorical (ordinal), unordered categorical (nominal), and count outcome variables are referred to as **u**. The circles represent latent variables. Continuous latent variables are referred to as **f**. Categorical latent variables are referred to as **c**.
Source: Mplus® Website

7.6.3 Centering Decisions in Multilevel Modelling

As the intercept and slope of the level-one model become the dependent variables in the level-two model, the interpretation of these outcomes depends upon the location or centering of the level-one predictor variables (Hofmann & Gavin, 1998). Three alternative scalings exist for level-one independent variables:

- *raw metric* or uncentered approach in their original form, which yields equivalent models as
- *grand-mean centering* – where the grand mean of the level-one variable is subtracted from each individual's score; and

- *group-mean centering* – where the group mean is subtracted from each individual's score on the predictor and yields a different model from the first two.

The choice should match the hypotheses and the paradigm represented in the data analysis. In the context of this study, grand-mean centering is recommended as it provides computational advantage over uncentered approach (Kreft et al., 1995), as this results in a reduction of the covariance between the intercepts and slopes, thereby reducing likely problems of multicollinearity.

Grand-mean centering is the appropriate method of choice for *main-effect model*s (Hofmann, Griffin & Gavin, 2000), as indeed are the hypothesised relationships in this study, more specifically those between transformational leadership/team climate and social support/decision latitude/control. Furthermore, the moderating variables are not group level variables and therefore, the moderation models are not cross-level models. Indeed, the interaction terms are introduced in the regression equations at level one.

Moreover, the second-level coefficients, for the grand-mean centered models, provide correct estimates of the individual-level effect and the contextual effect, when the contextual predictor variable is included in the second-level model. The group-mean-centered model leads to a second-level coefficient where individual-level effects are confounded with contextual-level effects.

When estimating level-two models, group-mean-centered models exclude between-group variance of level-one variables, whose effects are therefore not controlled. Additionally, in this study, it is the clustering effect and therefore, the contextual effect that is at stake. To control for unit size, this was included in its original format as an uncentered variable in the level-two equation (Hofmann & Gavin, 1998).

7.6.4 Control Variables

Previous studies have indicated that individual perceptions of work stressors and strains, as well as of leadership, team climate, social support, and decision latitude/control are influenced by age, gender, marital status, professional group, type of contract, years of experience, and finally, time spent in unit under study. Therefore, these variables are introduced and controlled for in all the level one models.

Furthermore, based on previous studies, where unit size appears to potentially influence some of the relationships under study, and also due to the fact that unit size varies widely across the sample, this variable was introduced and controlled for in all the level two models.

7.6.5 Common Method Variance

As discussed in chapter six, a potential problem in behavioural research is common method variance, which is the variance attributable to the measurement method rather than to the constructs the measures represent (Podsakoff et al., 2003). Method biases are indeed one of the major sources of measurement error, which threatens the validity of the conclusions about the relationships between variables and is composed of random and systematic components. It is the systematic component, which provides alternative explanations for the observed relationships yielding potentially misleading conclusions, and is therefore considered problematic. There are several potential sources of common method biases including common rater effects, item characteristic and context effects, as well as measurement context effects (Podsakoff et al., 2003).

Common rater effects refer to artifactual covariance between predictor and criterion variables as a result of having the same respondent providing both measures. In this study, this problem was overcome for the fourth group of hypotheses where aggregated unit-level transformational leadership and/or team climate scores from the hospital employees nested within units are proposed to be associated with unit-level performance obtained from different sources namely from external raters.

7.6.6 Proposed Models and Study Hypotheses

Study two utilised a two-level hierarchical model with grand mean centering of the variables intended at individual-level of analysis, to test the proposed hypotheses. This study includes a number of models which will be discussed in relation to the hypotheses.

Shared Transformational Leadership and Team Climate as Unit-Level Predictors

The first group of hypotheses aims at testing the association between transformational leadership (TL) and team climate (TC), and social support (TSS) and decision latitude/control (DLC). Based on equation 7.1, equation 7.5 forms the basis of the proposed group of hypotheses and has the form:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{AGE}) + \beta_{2j}(\text{SEX}) + \beta_{3j}(\text{MAR}) + \beta_{4j}(\text{EMP}) + \beta_{5j}(\text{PROFG}) + \beta_{6j}(\text{YRSU}) + \beta_{7j}(\text{YRSH}) + \beta_{8j}(\text{Well-being}) + r_{ij} \qquad (7.5)$$

where Y_{ij} is the value of social support (total composite score for social support, supervisor support, and co-worker support) and decision latitude/control for individual i in group j; AGE refers to the age of the individual; SEX refers to gender; MAR refers to marital status; EMP refers to type of contract of employment; PROFG refers to the professional group; YRSU refers to the time spent in unit at time of study; YRSH refers to years of experience in the health service. Past research has identified several demographic variables, such as age, marital status, professional background and experience as potential influences on social support and decision latitude/control (Karasek & Theorell, 1990).

Additionally, a measure of the unit members' psychological *well-being* was used as a control variable in the regression of social support and decision latitude control on transformational leadership and team climate, based on the premise that the quality of their perceptions may be influenced by this variable. Moreover, as the study focuses on the hospital unit-level, an objectively measured unit size from the Human Resource Department (UNSIZE) is included as a group or unit-level predictor, and is held constant across all level-two equations. This attribute has an impact on team structure and therefore team climate as well as on leadership. Indeed, for both team climate and leadership, previous studies have shown that there is an inverse relationship between team/unit size and team functioning (West et al., 2000; 2002) as well as an inverse relationship on the quality of leader-member exchange (Green, Anderson, & Shivers, 1996). Furthermore, to test main effects from higher-to-lower level relationships, the unit-level predictor is introduced at this level as shown in equation 7.6. The unit-level predictor would be transformational leadership, team climate or their sub-dimensions.

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{UNSIZE})_j + \gamma_{02}(\text{UNIT-LEVEL PREDICTOR})_j + u_{0j} \qquad (7.6)$$

Apart from using HLM, I will be using Mplus® to test for model fit of the complex relationships TL and TC with TSS and DLC.

Work Stressor-to-Strain-to-Unit Performance Mediated Relationships

There are two aspects in the analysis strategy that concerns the second group of hypotheses. These are mediation and testing of lower-to-higher level relationships. Based on Baron and Kenny's classical paper (1986), the mediator function of a third variable represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest. Baron and Kenny referred to ANOVA as providing a limited test of a mediational hypothesis. However, structural equation modelling is becoming increasingly used to test mediation, as all the relevant paths are directly tested and none are omitted as in ANOVA. Additionally, complications of measurement error, correlated measurement error, and even feedback are incorporated directly into the model. In this study, the computer software programme that will be used to test the second group of hypotheses, and therefore to estimate multilevel structural equation models involving mediation, is Mplus®.

Three types of influences are studied once adequate fit of the data has been obtained for the structural equation models, namely: *Work Stressors* to *Psychological Strains* to *Physiological Strains* to *Behavioural Strains* at individual level of analysis to *Unit Performance* at higher-level of analysis. These are direct, indirect, and total effects (Bollen, 1987). A direct effect is represented in a structural model as a single path, and refers to the influence of one variable on another. An indirect effect, on the other hand, analyses the impact of one variable on another as that variable's influence works through one or more intervening variables (Hoyle & Kenny, 1999). Specific indirect effects assess the roles of single intervening variables in a given relationship. The total effect of one variable on another is then referred to as the sum of its direct and indirect effects (Bollen, 1987).

Moderation and Two-way Interactions in a Multilevel Context

The third group of hypotheses deal with moderation or rather with the 'buffering' effects of social support and decision latitude/control on the associations between work stressors and psychological/physiological strains. According to Baron and Kenny (1986), *"the moderator function of third variables partitions a focal independent variable into subgroups that establish its domains of maximal effectiveness in regard to a given dependent variable"* (p.1173) and *"Specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables"* (p.1174). Within a correlational framework, a moderator effect may also be detected when the direction of the correlation changes. Moreover, Baron and Kenny (1986) explained that in analysis of variance (ANOVA) terms, a basic moderator effect can be represented as an interaction between the focal independent variable and the third variable that specifies the appropriate conditions for its operation. Hence the occurrence of two-way interactions. A moderator-interaction effect can also be detected if a relation between a predictor and criterion is substantially reduced instead of being reversed. Therefore, moderation can take various forms. Indeed, Baron and Kenny (1986) contended that moderators going from a strong to a weak relation, or to no relation at all, provide a stronger conceptual argument than when involved in a crossover interaction. On the other hand, crossover interactions are stronger statistically, as they are not accompanied by residual main effects.

Apart from testing for moderation, the third group of hypotheses acknowledge the multilevel context of the study, which is to say that the moderated relationships are modelled at the hospital unit member level but with the intention of examining variability across hospital units. As explained earlier on, most of the variables under study showed the influence of unit membership in the use of ordinary least squares (OLS) which would result in violation of the assumption of independence. Therefore, by using level-one equation in HLM, and utilising the format of moderated regression analysis of OLS, the variables were entered into the regression as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{AGE}) + \beta_{2j}(\text{SEX}) + \beta_{3j}(\text{MAR}) + \beta_{4j}(\text{EMP}) + \beta_{5j}(\text{PROFG}) + \beta_{6j}(\text{YRSU}) + \beta_{7j}(\text{YRSH}) + \beta_{8j}(\text{WORK STRESSOR}) + \beta_{9j}(\text{MODERATOR}) + \beta_{10j}(\text{WORK STRESSOR*MODERATOR}) + r_{ij} \quad (7.7)$$

Based on procedures by Aiken & West (1991) and Dawson & Richter (2006), two-way interactions were tested by regression analysis that included independent variables, moderators and their interaction (product) term. All the independent variables including the control variables and moderators were standardized before calculation of the product term. The product term (which is not standardized) should be significant in the regression equation in order for the interaction to be interpretable, and prior to plotting the interaction effects. Furthermore, unit size was included as a level two control variable and was included only in the intercepts-as-outcomes model (equation 7.8) assuming that unit size had only a direct effect on the variables at level one.

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{UNSIZE})_j + u_{0j} \quad (7.8)$$

Several two-way interactions using equations 7.7 and 7.8 were tested using HLM version 6.03, initially taking a macro- and later a micro-view of the buffering effects on the work stressor-to-strain relationships. Therefore, first the composite scores of work stressors, strains, and moderators were entered into the two-way interaction equations before proceeding to test the various combinations involving specific variables.

Moderation and Three-way Interactions in a Multilevel Context

The third group of hypotheses also includes three-way interactions involving the two moderators: social support and decision latitude/control, as 'buffering' the work stressor-to-strain relationships. To test for the three-way interactions that included the relationship between a variable X and dependent variable Y, moderated by variables Z and W, a regression analysis using HLM version 6.03 was run. Variable X referred to work stressor; variable Y referred to the psychological/physiological strain; moderator Z referred to social support; whereas variable W referred to decision latitude/control.

The procedure included entering all three independent variables, all three pairs of two-way interaction terms, and the three-way interaction term. All the independent variables were standardised before calculation of the product terms. As with two-way interactions, the interaction terms themselves were not standardised after calculation. The three-way interaction term had to be significant in the regression equation in order for the interaction to be interpretable (Dawson & Richter, 2006). The level-one and level-two equations are the following:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{AGE}) + \beta_{2j}(\text{SEX}) + \beta_{3j}(\text{MAR}) + \beta_{4j}(\text{EMP}) + \beta_{5j}(\text{PROFG}) + \beta_{6j}(\text{YRSU}) + \beta_{7j}(\text{YRSH}) + \beta_{8j}(\text{WORK STRESSOR}) + \beta_{9j}(\text{MODERATOR A}) + \beta_{10j}(\text{MODERATOR B}) + \beta_{11j}(\text{WORK STRESSOR*MODERATOR A}) + \beta_{12j}(\text{WORK STRESSOR*MODERATOR B}) + \beta_{13j}(\text{MODERATOR A*MODERATOR B}) + \beta_{14j}(\text{WORK STRESSOR*MODERATOR A*MODERATOR B}) + r_{ij} \qquad (7.9)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{UNSIZE})_j + u_{0j} \qquad (7.10)$$

As with the two-way interactions, several three-way interactions were tested using equations 7.9 and 7.10 as bases using HLM version 6.03, initially taking a macro- and later a micro-view of the buffering effects of the two moderators on the work stressor-to-strain relationships. Likewise, first the composite scores of work stressors, strains, and moderators were entered into the three-way interaction equations before proceeding to test the various combinations involving specific variables.

Step-wise Estimation and Evaluation of Parsimonious Models in HLM

Raudenbush and Bryk (2002) proposed a step-up approach in the parsimonious model building that is achieved by evaluating the extent of random variation at each level prior to introducing predictors at the next level. Therefore, before introducing unit-level predictors, one should ascertain sufficient variability with the outcome of interest as indicated by the variance of the residual term (u_{0j}). Consequently, model estimation involves the following steps.

The first step involves estimating the unconditional model, which has to do with the process of estimating both level one and level two models without any predictor variables. Model building proceeds if there is sufficient variability of the outcome variables across units. The second step entails random coefficient regression modelling, which involves introducing level one predictors of the outcome variable. This step determines whether X_{ij} is statistically significant in predicting the outcome variable. Additionally, it determines whether there is sufficient slope heterogeneity [i.e., $Var(\beta_q) > 0$]. Raudenbush and Bryk (2002) proposed that through random coefficient regression modelling, one determines which level-one predictors to retain for the final model. These authors recommended that deletion of a level-one predictor necessitates two conditions, namely no statistical evidence of slope heterogeneity, and no statistical evidence of a fixed effect. Therefore, t-ratio would be non-significant and the magnitude of the regression coefficient (γ_{q0}) is small. This research involves *intercept-as-outcome models* whereby the intercepts of the level-one models were estimated as randomly varying across hospital units.

Association between Unit-Level Transformational Leadership and/or Team Climate, and Hospital Unit Performance

The fourth and final group of hypotheses deals with analysing the relationships between higher-level or hospital unit variables. In this case, the unit of analysis does no longer include individuals but just hospital units. The units are well-defined and largely self-managing. Therefore, I could assume independence of observations and therefore use OLS by means of SPSS version 14.0. Furthermore an *ICC(2,K)* of .59 of unit performance suggests an acceptable between-group variance of the variable. With regard to the predictor variables, transformational leadership achieved *ICC(2)* values above 0.7, whereas team climate's *ICC (2)* was above 0.5, suggestive of acceptable between-group variance. This group of hypotheses overcomes common source bias more effectively, in that the sources of information for the predictors and criterion variables are different. Indeed, transformational leadership and team climate are aggregated measures from perceptions of individual health care professionals within the hospital units, whereas unit performance was captured from a group of external raters that were not members of the hospital units under study.

Estimation of Effect Sizes in Hierarchical Linear Modelling

The reporting of effect sizes in research interpretation has become increasingly popular to the extent that researchers are encouraged to consider the magnitude of the relationship, rather than just the *p-value* before making interpretations that would render a study worth mentioning (APA *Publication Manual;* 2001, p.26; Harlow, Mulaik, & Steiger, 1997). Indeed effect sizes are useful to evaluate the magnitude of a statistically significant relationship (Cohen, 1994). Effect sizes are part of the SPSS output in multiple regression using OLS but need to be derived in HLM. Indeed, as multilevel modelling becomes increasingly useful, researchers are now striving to develop valid ways of estimating effect sizes and detecting how much variance a given multilevel model explains. Some authors suggest estimating interactions by using OLS regression on the multilevel data files (Hofmann, Morgeson, & Gerras, 2003; Zohar & Luria, 2005) with group-level variable scores assigned down to individuals within the group. This method however, violates the assumption of independence of error terms.

Snijders and Bosker (1999) and Hox (2002), on the other hand, provide formulas to detecting effect sizes in multilevel models. These are based on F squared, which is considered the best measure of effect size (Aguinis, Beaty, Boik, & Pierce, 2005). F squared is the change in R squared (R^2) divided by the remaining variance. Cohen (1988) suggested that for F squared, the effect sizes around .02, .15, and .35 as being small, medium, and large respectively. To get the R^2 change, three models are identified namely the null model (with no predictors), the intermediate model (with control variables) and the final model (with predictor). The R^2 for level-1 is computed as one minus the combined variance at both levels for the full model divided by the combined variance for the null model. The addition of predictors is to decrease the amount of unexplained variance (Aguinis et al., 2005). The following formulas are by Snijders and Bosker (1999);

$$R_1^2 = 1 - \frac{\mathrm{var}\left(Y_{ij} - \sum_h \gamma_h X_{hij}\right)}{\mathrm{var}\left(Y_{ij}\right)} = 1 - \frac{\hat{\sigma}^2(full) + \hat{\tau}_0^2(full)}{\hat{\sigma}^2(null) + \hat{\tau}_0^2(null)} \tag{7.11}$$

Where Y_{ij} is the outcome variable, γ_h represents the coefficient for outcome variable X_{hij} for all h variables, $\hat{\sigma}^2$ is an estimate of the variance at the first level, and $\hat{\tau}_0^2$ is an estimate of the variance at the second level. The level-2 R^2 is then found by dividing the $\hat{\sigma}^2$ by the group cluster size (B), or by the average cluster size for unbalanced data, as shown in the following:

$$R_2^2 = 1 - \frac{\operatorname{var}\left(\overline{Y}_{.j} - \sum_h \gamma_h \overline{X}_{h.j}\right)}{\operatorname{var}\left(\overline{Y}_{.j}\right)} = 1 - \frac{\frac{\hat{\sigma}^2(full)}{B} + \hat{\tau}_0^2(full)}{\frac{\hat{\sigma}^2(null)}{B} + \hat{\tau}_0^2(null)} \tag{7.12}$$

Kreft and De Leeuw (1998) point out the above formulas may not apply to situations where there are random intercepts with the possible problem that the variance in the restricted model is larger than the unrestricted model resulting in a negative R^2.

7.7 Chapter Summary

This chapter has provided the details that form the backbone of a rigorous scientific study. Indeed, several steps had to be taken to ensure reliability and validity of the study. Furthermore, the psychometrics of the instruments utilised in this study could be compared with past research. This study also considered violation of the assumptions of ordinary least squares, namely violation of the independence of observations, to justify the adoption of multilevel modelling and analysis. This chapter provided details on aggregation of unit member-level data to unit-level shared construct, which shows compositional emergence from the characteristics, behaviours and cognitions of unit members and their interactions. Although originating at the lower level, these constructs are manifest at the higher level. At the same time, it related the proposed models with the four groups of hypotheses, outlining along the way the multilevel analysis strategy adopted. The next chapter will provide in a comprehensive way, the results of study two.

CHAPTER EIGHT

STUDY TWO
RESULTS

8.1 Introduction to the Results of Study Two

This chapter provides the main findings of study two, based on primary data collected in 2005/2006. Data were collected from three sources namely: self-report survey responses from hospital employees nested in hospital units, ratings of these units' performance by external raters, and data on absenteeism from the Human Resource Department.

Four groups of testable hypotheses were developed as outlined in chapter five. In addition to the study scales described in previous chapters, demographic data were also collected from each respondent. Furthermore, the use of unique individual IDs, as well as unique unit IDs, enabled me to consider individual responses to unit characteristic variables for aggregation into group-level variables.

In chapter seven, I presented the indices of within-group agreement $R_{wg\,(j)}$ and intraclass correlations, which are needed to justify aggregation to group level and to justify multilevel analysis.

This chapter will present an overview of the characteristics of the study sample together with the results of hypotheses testing.

8.2 Description of the Sample

As described in chapter six, the respondents in the sample consisted of 1, 137 hospital employees nested in 136 hospital units. The leaders' perceptions were excluded from the sample, as discussed in chapter six. The demographic details and other descriptors of the sample are essential for two purposes: first and foremost, to provide a profile of the sample under investigation for comparative purposes with other studies, and secondly, to use them as control variables during hypotheses testing.

8.2.1 The Demographic Profile

The age profile is shown in Table 8.1, with the highest percentages being in the 21-30 and 31-40 year age groups.

Table 8.1
Age Profile of Survey Respondents

YEARS of AGE	Frequency	Valid Percent
16-20	3	.3%
21-30	430	38.0%
31-40	376	33.2%
41-50	226	20.0%
51-65	97	8.6%
Total Valid	1132	100.0%
Missing	5	
Grand Total	1137	

Thirty-eight percent of the respondents were male, and sixty two percent were female. The gender profile of the sample is shown in Table 8.2.

Table 8.2
Gender Profile of Survey Respondents

GENDER	Frequency	Valid Percent
Male	432	38.2%
Female	698	61.8%
Total	1130	100.0%
Missing	7	
Total	1137	

The marital status profile of the respondents is shown in Table 8.3, showing a predominantly married workforce among the respondents.

Table 8.3
Marital Status Profile of Survey Respondents

MARITAL STATUS	Frequency	Valid Percent
Single	**396**	**35.1%**
Married/Living with partner	**686**	**60.8%**
Divorced/Separated/Widowed	**46**	**4.1%**
Total Valid	**1128**	**100.0%**
Missing	**9**	
Grand Total	**1137**	

Ninety percent of respondents had a full-time employment as shown in Table 8.4.

Table 8.4 Employment Status Profile of Survey Respondents

EMPLOYMENT STATUS	Frequency	Valid Percent
Full-time	**1018**	**90.2%**
Part-time	**42**	**3.7%**
Reduced hours	**69**	**6.1%**
Total Valid	**1129**	**100.0%**
Missing	**8**	
Grand Total	**1137**	

Table 8.5 shows the professional background of the respondents with, as expected, a clear majority occupied by nursing/midwifery professions.

Table 8.5
Professional Status Profile of Survey Respondents

PROFESSIONAL BACKGROUND	Frequency	Valid Percent
Medical/Dental	**148**	**13.0%**
Allied Health Professions	**110**	**9.7%**
Medical Scientists	**66**	**5.8%**
Nursing/Midwifery	**649**	**57.2%**
Pharmacists	**33**	**2.9%**
General Management	**11**	**1.0%**
Administration/Clerical	**51**	**4.5%**
Others	**67**	**5.9%**
Total	**1135**	**100.0%**
Missing System	**2**	
Grand Total	**1137**	

Appendix 13 shows three bar charts that illustrate the age, gender, and marital status of the various professional groups, by means of bar charts. Figures 8.1 and 8.2 (next page) illustrate the duration of employment in health care and in the hospital unit respectively, where the respondents were working at the time of study. Both curves are, as expected, positively skewed with that for employment in unit being more skewed than that for employment in the health service.

Figure 8.1
Duration of Employment in Health Care

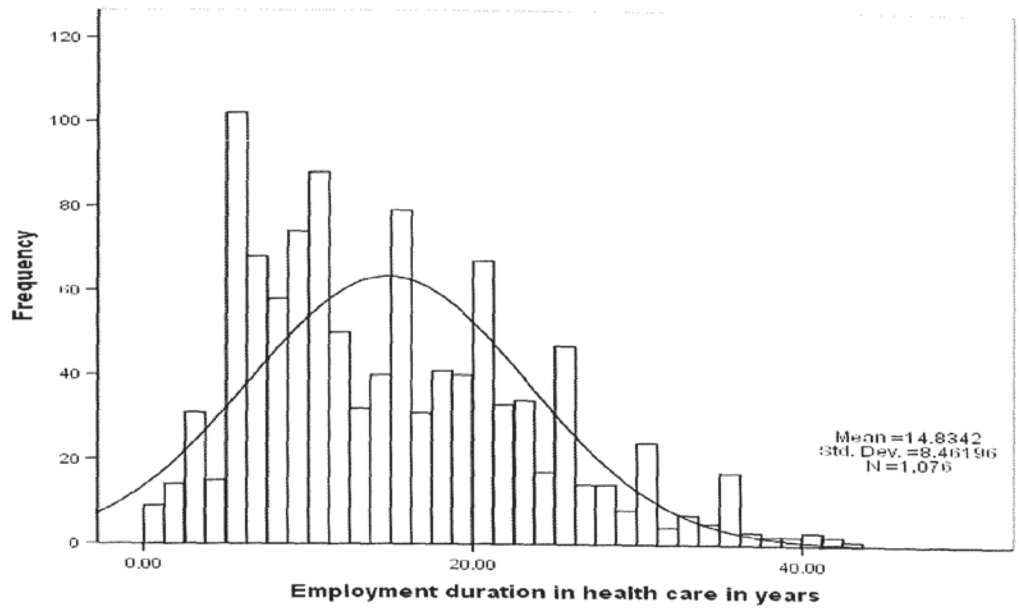


Figure 8.2:
Duration of Employment in the Specific Hospital Unit at Time of Study

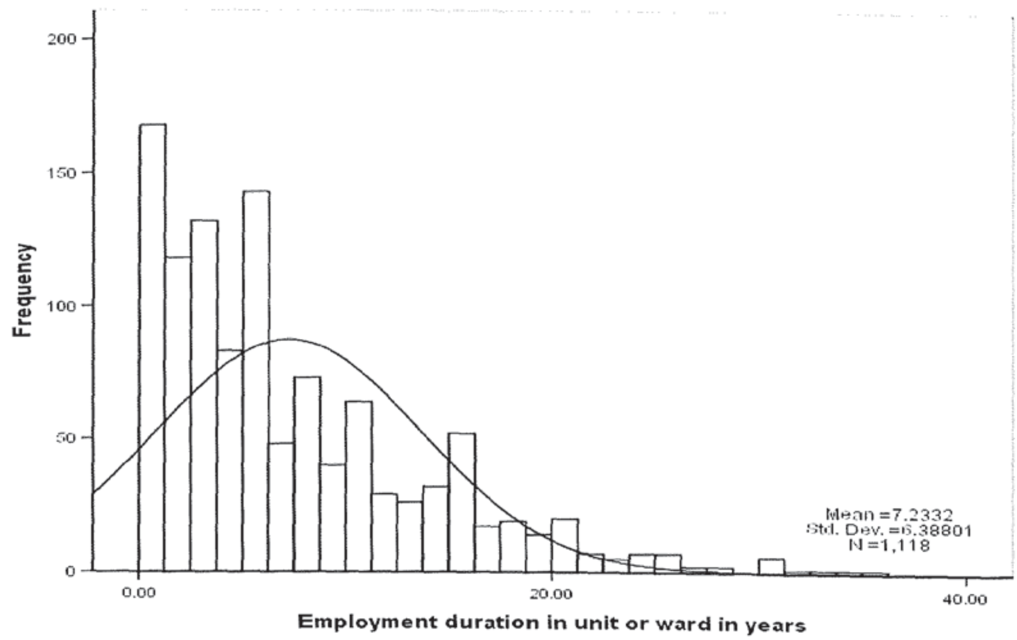
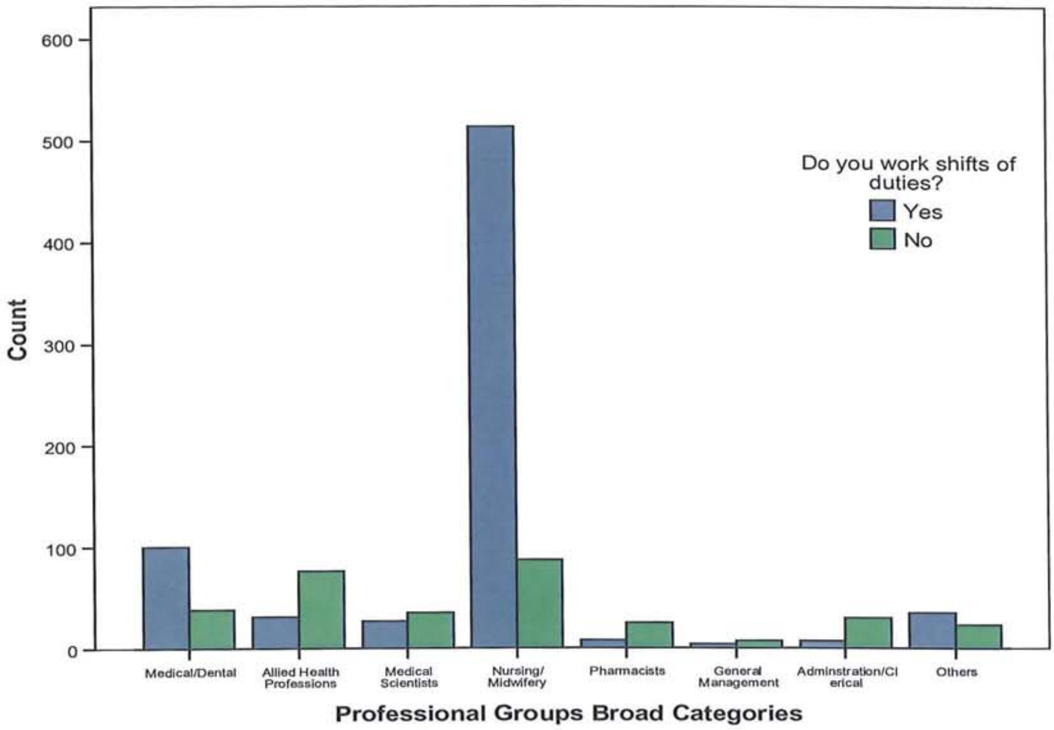


Table 8.6 shows that 64% as opposed to 28%, of the sample worked shifts. The shift workers were mostly nurses (Figure 8.3).

Table 8.6
Profile of Respondents Regarding Shift Work

Do You Work Shifts?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	725	63.9%	69.3 %	69. 3%
No	321	28.3%	30.7%	100. 0%
Total	1046	92.2%	100. 0%	
Missing	91	7.8%		
Total	1137	100.0%		

Figure 8.3
Bar Chart Showing Shift Work Profile among Professional Groups



8.2.2 Pearson Correlation Coefficients (r), Effect Sizes, and Multicollinearity

Correlation analysis is used to describe the strength and direction of the linear relationship between two variables. Pearson product-moment correlation is a scale-free measure for continuous variables that assesses the degree to which two variables are related (Valentine & Cooper, 2003). The statistical significance by itself does not imply *practical significance* or relative impact of the effect size. Therefore, the magnitude of the strength and direction of the linear relationship can be stated by means of (r), and by the standardized mean difference statistic (d), which is also a scale-free measure of the separation between two groups.

Cohen (1988) provided guidelines to the interpretation of effect sizes in terms of small ($r=\pm0.10$ to ±0.29, $d=0.20$), medium ($r=\pm0.30$ to ±0.49, $d=0.50$), and large ($r=\pm0.50$ to ±1.00, $d=0.80$) effect sizes in the social and behavioural sciences.

The correlation matrix provides a useful check for multicollinearity, which occurs when highly related independent variables ($r>.80$), regardless of the dependent variable chosen, are included in the same regression model (Cohen, Cohen, West, & Aiken, 2003).

In cross-sectional research, multicollinearity occurs when independent variables include multiple measures of same/similar constructs or in aggregated scales due to overlap of items. The latter is the case with transformational leadership - composite score and its dimensions, and also with team climate-composite score and its dimensions. Therefore, multicollinearity should be checked because it gives rise to redundant data, unstable regression coefficients and large standard errors.

The means, standard deviations and correlations among the hospital unit-level measures (Level-2-HLM /BETWEEN UNIT-Mplus®) are shown in Table 8.7 (next page).

Table 8.7: Means, Standard Deviations, and Correlation Coefficients for Unit-Level Variables

	VARIABLE	$\bar{x}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	Unit Size	14.70	11.70												
2	*Transformational Leadership (TL)(Composite)*	*2.98*	*.51*	*-.36(**)*											
3	Vision *(TL)*	3.14	.56	-.35(**)	.89(**)										
4	Inspiritational Communication *(TL)*	2.96	.61	-.31(**)	.95(**)	.82 (**)									
5	Intellectual Stimulation *(TL)*	2.92	.47	-.25(**)	.88(**)	.77(**)	.80(**)								
6	Supportive Leadership *(TL)*	2.89	.61	-.38(**)	.90(**)	.70(**)	.84(**)	.72(**)							
7	Personal Recognition *(TL)*	2.97	.55	-.33(**)	.92(**)	.73(**)	.85(**)	.74(**)	.82(**)						
8	*Team Climate (TC)(Standardized score – Composite)*	*-.01*	*.43*	*-.04*	*.41(**)*	*.34(**)*	*.43(**)*	*.32(**)*	*.35(**)*	*.43(**)*					
9	Team Participation *(TC)*	3.48	.44	-.07(*)	.25(**)	.19(**)	.24(**)	.17(**)	.23(**)	.28(**)	.86(**)				
10	Support for New Ideas *(TC)*	3.26	.44	-.08(**)	.46(**)	.38(**)	.48(**)	.36(**)	.38(**)	.47(**)	.89(**)	.72(**)			
11	Team Objectives *(TC)*	4.47	.60	-.06	.39(**)	.35(**)	.39(**)	.28(**)	.33(**)	.39(**)	.77(**)	.48(**)	.55(**)		
12	Team Task Style *(TC)*	4.36	.62	.07(*)	.36(**)	.30(**)	.39(**)	.27(**)	.29(**)	.35(**)	.92(**)	.73(**)	.79(**)	.68(**)	
13	Unit Performance	2.82	.59	-.10(**)	.23(**)	.32(**)	.22(**)	.18(**)	.16(**)	.17(**)	.12(**)	.10(**)	.08(**)	.16(**)	.09(**)

**** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).**

(N=136 units)

8.2.2.1 Unit size

Unit size is significantly ($p<.01$) and negatively correlated ($r = -.36$) with aggregated measures of transformational leadership and its five sub-dimensions, namely: aggregated measures of vision (-.35), inspirational communication ($r = -.31$), intellectual stimulation ($r = -.25$), supportive leadership ($r = -.38$) and personal recognition ($r = -.33$). Effect sizes are moderate. These results are in line with the findings by Rafferty and Griffin (2006). Unit size is not significantly correlated with the composite score of team climate and clarity of team objectives. Unit size is, however, weakly and negatively correlated with team participation ($r = -.07$), and support for new ideas ($r = -.08$). Finally, unit size is negatively correlated with unit performance ($r = -.10$, $p<.01$), with a small effect size. Although the strength of the correlations between team climate and unit size are not as expected, the stronger negative correlation with unit performance reaffirms West's empirically-based assertion that team size is a predictor of well-functioning teams (1994, 2001).

8.2.2.2 Transformational Leadership, Team Climate, and Unit Performance

Table 8.7 shows that transformational leadership is significantly and positively correlated with team climate ($r = .41$, $p<.01$, medium effect size). All the five sub-dimensions of transformational leadership are significantly and positively correlated with team climate ($r = .32$ to $.43$, $p<.01$, medium effect sizes). There are also significant and positive correlations between the sub-dimensions of transformational leadership and those of team climate ($r = .19$ to $.48$, $p<.01$, small to medium effect sizes). Inspirational communication is significantly and positively correlated with support for new ideas in the team ($r = .48$, $p<.01$, medium effect size). These findings are as expected and in line with the scanty evidence provided by Arnold et al. (2001)

and Özaralli (2003). Also worth noting is that personal recognition by the transformational leader is significantly and positively correlated with support for new ideas in the team (r = .47, p<.01, medium effect size). As transformational leadership and team climate were self-report data obtained from the same source namely, from hospital employees nested within units, an overall common method variance factor might have accounted for some of the inter-correlations (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

In contrast, the correlations with unit performance are more accurate, since unit performance was measured through external ratings, which constitute a different data source than that for transformational leadership and team climate. Common source bias was thus overcome. Unit performance is significantly and positively correlated with Transformational Leadership (r = .23, p<.01), and with its five sub-dimensions (r = .16 to .32, p<.01). Additionally, unit performance is positively and significantly correlated with team climate (r = .12, p<.01); team participation (r = .10, p<.01); support for new ideas in the team (r = .08, p<.01); clarity of team objectives (r = .16, p<.01); and team's task style (r = .09, p<.01).

Therefore, although the effect sizes in relation to unit performance were small, the exclusion of common source bias renders them more accurate. These findings are as expected and in line with a fast developing area of research linking transformational leadership and performance, as discussed in chapter three.

The means, standard deviations, and correlations among variables intended at individual-level of analysis (Level-1 in HLM; WITHIN UNIT in Mplus®) are shown in Tables 8.8 (next page).

Table 8.8: Means, standard Deviations, and Correlation Coefficients for Individual-Level Variables

	VARIABLE	$\bar{x}$	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Age (5 broad groups)±	2.99	.97																										
2	Employment duration in health care in years	14.8	8.5	.76 (**)																									
3	Employment duration in unit or ward in years	7.23	6.4	.40 (**)	.58 (**)																								
4	Total Mean Score Supervisor Support	3.27	.87	.03	-.00	-.06																							
5	Total Mean Score Co-worker Support	3.72	.70	-.11 (**)	-.10 (**)	-.04	.28 (**)																						
6	Total Mean Score Social Support	3.50	.63	-.04	-.06	-.07 (*)	.85 (**)	.75 (**)																					
7	Total Mean Score Decision Latitude/ Control	56.7	6.8	.02	.08 (**)	.03	.15 (**)	.17 (**)	.20 (**)																				
8	Psychological Job Demands	3.61	.60	-.13 (**)	-.08 (**)	-.02	-.15 (**)	.00	-.10 (**)	.11 (**)																			
9	Physical Exertion	3.35	1.17	-.17 (**)	-.12 (**)	-.06 (*)	-.17 (**)	-.02	-.13 (**)	-.01	.41 (**)																		
10	Quantitative Workload	3.78	.99	-.12 (**)	-.11 (**)	-.01	-.10 (**)	.02	-.06	.05	.67 (**)	.43 (**)																	

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). (N=1,136) ± Age Groups: 1=16-20 years; 2=21-30 years; 3=31-40 years; 4=41-50 years; 5=51-65 years.

Table 8.8: Means, standard Deviations, and Correlation Coefficients for Individual-Level Variables...continued

	VARIABLE	$\bar{x}$	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
11	Qualitative Workload	1.91	.86	-.13 (**)	-.16 (**)	-.09 (**)	-.09 (**)	-.08 (**)	-.10 (**)	-.07 (*)	.28 (**)	.17 (**)	.34 (**)																
12	Nature of Work	3.17	.66	-.19 (**)	-.17 (**)	-.07 (*)	-.18 (**)	-.03	-.14 (**)	.01	.74 (**)	.75 (**)	.82 (**)	.59 (**)															
13	Total Mean Score Organizational Constraints	3.05	.69	-.15 (**)	-.13 (**)	-.04	-.36 (**)	-.25 (**)	-.39 (**)	-.06	.45 (**)	.24 (**)	.34 (**)	.40 (**)	.46 (**)														
14	Total Mean Score Interpersonal Conflict at Work Scale	.31	.15	-.07 (*)	-.06	.01	-.21 (**)	-.27 (**)	-.30 (**)	-.12 (**)	.25 (**)	.23 (**)	.18 (**)	.28 (**)	.32 (**)	.43 (**)													
15	Incidents at Work	1.97	.85	-.07 (*)	-.06	-.00	-.13 (**)	-.09 (**)	-.15 (**)	-.10 (**)	.20 (**)	.46 (**)	.20 (**)	.22 (**)	.39 (**)	.24 (**)	.24 (**)												
16	Move to New Hospital Site	2.51	.84	-.01	.00	.03	-.09 (**)	-.05	-.09 (**)	-.11 (**)	.10 (**)	.17 (**)	.13 (**)	.18 (**)	.20 (**)	.20 (**)	.16 (**)	.20 (**)											
17	Total Mean Composite Score of Work Stressors	-.01	3.75	-.18 (**)	-.16 (**)	-.04	-.29 (**)	-.17 (**)	-.30 (**)	-.07 (*)	.67 (**)	.56 (**)	.64 (**)	.60 (**)	.83 (**)	.78 (**)	.57 (**)	.43 (**)	.43 (**)										
18	Job Satisfaction	3.25	.75	.11 (**)	.07 (*)	.03	.60 (**)	.39 (**)	.63 (**)	.40 (**)	-.21 (**)	-.18 (**)	-.14 (**)	-.17 (**)	-.24 (**)	-.46 (**)	-.31 (**)	-.25 (**)	-.11 (**)	-.40 (**)									
19	Intention to Leave Job	2.63	1.21	-.09 (**)	-.08 (*)	-.06 (*)	-.27 (**)	-.18 (**)	-.28 (**)	-.13 (**)	.21 (**)	.11 (**)	.17 (**)	.18 (**)	.22 (**)	.32 (**)	.22 (**)	.19 (**)	.08 (**)	.31 (**)	-.39 (**)								
20	Emotional Exhaustion	3.08	.95	-.14 (**)	-.07 (*)	-.03	-.28 (**)	-.18 (**)	-.30 (**)	-.07 (*)	.51 (**)	.34 (**)	.42 (**)	.35 (**)	.53 (**)	.52 (**)	.35 (**)	.32 (**)	.20 (**)	.62 (**)	-.46 (**)	.50 (**)							

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). (N=1,136)

Table 8.8: Means, standard Deviations, and Correlation Coefficients for Individual-Level Variables...continued

	VARIABLE	$\bar{x}$	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
21	Depersonalization	.30	.16	-.18 (**)	-.18 (**)	-.07 (*)	-.09 (**)	-.12 (**)	-.13 (**)	-.06	.20 (**)	.16 (**)	.17 (**)	.43 (**)	.32 (**)	.34 (**)	.30 (**)	.20 (**)	.20 (**)	.41 (**)	-.20 (**)	.26 (**)	.45 (**)						
22	Personal Accomplishment	3.67	.68	.09 (**)	.14 (**)	.09 (**)	.06	.11 (**)	.10 (**)	.30 (**)	.08 (**)	.01	.04	-.11 (**)	.00	-.00	-.05	-.04	-.14 (**)	-.07 (*)	.13 (**)	-.06 (*)	-.03	-.22 (**)					
23	Maslach Burnout Inventory	6.34	1.5	-.18 (**)	-.15 (**)	-.07 (*)	-.23 (**)	-.19 (**)	-.27 (**)	-.12 (**)	.41 (**)	.29 (**)	.35 (**)	.46 (**)	.49 (**)	.50 (**)	.38 (**)	.32 (**)	.24 (**)	.60 (**)	-.41 (**)	.45 (**)	.87 (**)	.81 (**)	-.26 (**)				
24	Total Composite Score Psychological Strains	-.00	.65	-.19 (**)	-.17 (**)	-.09 (**)	-.40 (**)	-.30 (**)	-.45 (**)	-.30 (**)	.33 (**)	.24 (**)	.27 (**)	.39 (**)	.40 (**)	.51 (**)	.38 (**)	.32 (**)	.23 (**)	.56 (**)	-.68 (**)	.69 (**)	.76 (**)	.66 (**)	-.43 (**)	.87 (**)			
25	Physiological Strains	5.22	3.2	-.04	-.03	-.02	-.09 (**)	-.12 (**)	-.13 (**)	-.05	.19 (**)	.20 (**)	.17 (**)	.20 (**)	.26 (**)	.26 (**)	.25 (**)	.30 (**)	.14 (**)	.34 (**)	-.20 (**)	.20 (**)	.37 (**)	.18 (**)	-.06 (*)	.34 (**)	.32 (**)		
26	Psychological Well-being	2.09	.65	-.06	-.06 (*)	-.07 (*)	-.11 (**)	-.14 (**)	-.16 (**)	-.06 (*)	.16 (**)	.12 (**)	.10 (**)	.22 (**)	.20 (**)	.25 (**)	.25 (**)	.25 (**)	.18 (**)	.32 (**)	-.21 (**)	.25 (**)	.41 (**)	.28 (**)	-.18 (**)	.42 (**)	.41 (**)	.51 (**)	
27	Total 6 month April -September 2005 Sick Leave	5.01	8.0	-.01	-.00	-.02	-.05	-.01	-.04	-.05	.06 (*)	.07 (*)	.04	.01	.06 (*)	.07 (*)	.06 (*)	.12 (**)	.07 (*)	.09 (**)	-.09 (**)	.06 (*)	.10 (**)	.00	-.02	.07 (*)	.09 (**)	.11 (**)	.08 (**)

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). (N=1,136)

With the exception of the composite scores that include *known* overlap of items, such as total social support, nature of work, total work stressors, burnout, and psychological strains, none of the other correlations are above 0.8. However, since the composites and their scales will not be entered in the same regression equations, there is consequently no problem with multicollinearity. Most relations, although significantly correlated, have correlation coefficients around 0.2, and therefore, do not suggest multicollinearity. Furthermore, construct and discriminant validity of the scales was carried out by means of factor analysis as discussed in chapter seven.

8.2.2.3 Age, Employment Duration, Gender and Marital Status

As expected age is significantly and positively correlated with employment duration both in health care as well as in the specific unit (r = .76, r = .40 respectively; $p<0.01$). Most of the correlation coefficients between age or employment duration and the study scales are below 0.2. Furthermore, physiological strains and absenteeism are not correlated with age or employment duration.

There are a number of significant gender differences for the variables listed in Table 8.9 (next page), but the effect sizes are small (Cohen, 1988). Similarly, there is a number of significant marital status differences (Table 8.10, next page) with small effect sizes. In very general terms, the correlations of these control variables with the variables under study are not different from the ones that have been published. However, it is beyond the scope of this thesis to delve deeper in the issues surrounding these variables, which are considered solely as control variables and treated as such during the analyses.

Table 8.9
Statistically Significant Gender Differences

Continuous Variable	Mean Value Males	Mean Value Females	t-value	df	P value	Eta Squared*
Organisational Constraints	3.13	3.01	2.79	1035	.005	.007
Job Satisfaction	3.18	3.30	-2.42	787	.016	.007
Physical Exertion	3.23	3.44	-2.81	1035	.005	.008
Qualitative Workload	2.04	1.84	3.69	1035	.000	.016
Intention to Leave Job	2.82	2.52	3.91	1035	.000	.015
Emotional Exhaustion	3.15	3.03	1.97	1035	.049	.004
Depersonalisation	.35	.28	7.00	1035	.000	.045
Burnout- Composite Score	6.62	6.17	4.59	1035	.000	.020
Physiological Strains	4.95	5.44	-2.33	774	.020	.007
Psychological Well-being	2.03	2.13	-2.38	1035	.018	.005
Move to New Hospital	2.61	2.46	2.70	1035	.007	.007

Table 8.10
Statistically Significant Marital Status Differences ±

Variable		df	F	Sig.	Eta Squared
Organizational Constraints	Between Groups	2	7.800	.000	.014
	Within Groups	1117			
Interpersonal Conflict at Work Scale	Between Groups	2	3.615	.027	.007
	Within Groups	1117			
Psychological Job Demands	Between Groups	2	6.384	.002	.011
	Within Groups	1118			
Physical Job Demands	Between Groups	2	8.643	.000	.015
	Within Groups	1118			
Quantitative Workload	Between Groups	2	5.422	.005	.010
	Within Groups	1114			
Qualitative Workload	Between Groups	2	10.390	.000	.010
	Within Groups	1109			
Emotional Exhaustion	Between Groups	2	4.256	.014	.020
	Within Groups	1119			
Depersonalization	Between Groups	2	6.353	.002	.010
	Within Groups	1119			
Burnout Composite Score	Between Groups	2	7.384	.001	.013
	Within Groups	1119			

** Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988)*
± Marital Status: 1= Single; 2= Married/Living with Partner; 3= Divorced/Separated/ Widowed

8.2.2.4 The Moderators: Social Support and Decision Latitude/Control

Supervisor support is significantly and positively correlated with co-worker support ($r = .28$, $p<.01$, small effect size), and decision latitude/control ($r = .15$, $p<.01$, small effect size). Most of the correlation coefficients between the moderator variables and work stressors/strains are below 0.3, except for the following correlations.

The work stressor 'organizational constraints' is significantly and negatively correlated with supervisor support (r = -.36), and total social support (r = -.39). This may partly be due to some items that probe participants on the sources of 'organizational constraints' being '*Your Supervisor*' and '*Inadequate help from others*'. However, the relationship may also be explained in terms of lack of support from one's supervisor, thereby reflecting the low influence by the unit leader on hospital management in attracting adequate resources for the respondents' hospital unit.

Job satisfaction is significantly and positively correlated with supervisor support (r = .60), co-worker support (r = .40), total social support (r = .63), and decision latitude/control (r = .40). The relatively high correlation coefficients that would be classified as medium to large effect sizes (Cohen, 1988) may also be due to some overlap in the data on job satisfaction arising from "*The support I get from my immediate supervisor*" with supervisor support; "*The support I get from my work colleagues*" with co-worker support; and "*The freedom I have to choose my own method of working*" with decision latitude/control.

Therefore, the correlation coefficients (r = -.40, and r = -.45) of total composite psychological strains that includes dissatisfaction with one's job, with supervisor support, or with total social support, may similarly reflect the overlap of data.

8.2.2.5 Work Stressors and Strains

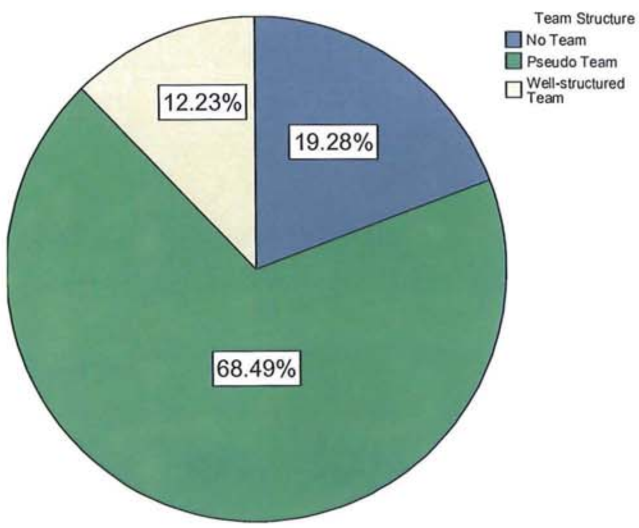
In general, the correlation coefficients between work stressors and strains are mainly in the range 0.30 - 0.45, which is sufficient for further analysis while at the same time it excludes multicollinearity. The only high correlations are those expected between composite scores and their dimensions, and therefore, they are meaningless since these will not be entered in the same regression equations. Additionally, the strength and direction of the relationships between work stressors and strains are as expected, and in accordance with the literature.

Specifically regarding the four dimensions of nature of work, the correlation coefficients between these variables, namely psychological demands, physical demands, quantitative workload and qualitative workload, are on average 0.3 to 0.4 with the highest being 0.67, possibly due to similar references to the physical side of work, albeit probing for different aspects.

8.2.3 Team Structure

Figure 8.4 shows that the majority of respondents (68.5%) were perceived as working in teams, but they actually did not fulfil all the criteria of well-functioning teams, as identified in chapter 6. This is much higher than the British sample in study one (46.5%). The percentage of 19.3% that did not work in teams in study two compares well with the 14.9% in study one, which shows a higher percentage (46.5%) of those working in well-structured teams compared to the Maltese sample (12.2%).

Figure 8.4: Pie Chart Showing Team Structure Percentages in the Sample



There were no meaningful differences between those in real teams versus those in no team, and versus those in pseudo teams, when comparing the three groups by age, gender, and marital status. Appendix 14 shows a breakdown of team structure by professional group.

Table 8.11 (next pages) shows the means, standard deviations, differences between means and correlations between variables in the model across the three groups of team structure for study two. Most of the study variables are moderately correlated.

The set of multivariate tests of significance, namely Wilk's lambda (.80) and Pillai's trace (.20) with significance value of $p<.0001$ confirms the statistically significant differences between those in real teams, pseudo team and no team. The results show statistically significant differences across all variables, except for psychological job demands, quantitative overload, qualitative overload, and organisational change due to *Move to New Hospital Site*, physiological strains, and sickness absence, which varied meaningfully only across gender, with females taking more sick leave than males.

Otherwise, sickness absence did not vary across age, marital status, or professional group. Those in real teams had higher means for: supervisor, co-worker and total social support; decision latitude/control; job satisfaction; personal accomplishment; and lower perceptions of all the stressors and strains. These results are as expected, and in line with published literature.

Table 8.11: Means, Standard Deviations, Differences between Means, and Inter-correlations among Study Variables Intended at Individual-Level of Analysis for those in No Team (n= 172), Pseudo Team (n= 637) and those in Real Teams (n=112).

Variable	Team Structure	$\bar{x}$	SD	Pvalue ±± (Effect Size)±	F (df)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Total Mean Score Supervisor Support	No Team	3.03	.84	.000 (.08)	39.7 (2, 918)																							
	Pseudo Team	3.23	.83																									
	Real Team	3.89	.78																									
2. Total Mean Score Coworker Support	No Team	3.46	.72	.000± ±± (.06)	27.5 (2, 918)	.28 **																						
	Pseudo Team	3.74	.67			.21 **																						
	Real Team	4.05	.56			.26 **																						
3. Total Mean Score Social Support	No Team	3.25	.60	.000 (.11)	53.9 (2, 918)	.85 **	.75 **																					
	Pseudo Team	3.48	.58			.83 **	.72 **																					
	Real Team	3.97	.53			.86 **	.71 **																					
4. Total Mean Score Decision Latitude/ Control	No Team	54.94	6.70	.000 (.04)	19.0 (2, 918)	.16 **	.17 **	.20 **																				
	Pseudo Team	56.50	6.64			.13 **	.18 **	.20 **																				
	Real Team	59.86	6.59			.06	-.20*	-.06																				
5. Psychological Job Demands	No Team	3.61	.59	.824 (.00)	.2 (2, 918)	-.15 **	.00	-.10 **	11 **																			
	Pseudo Team	3.60	.62			-.13 **	.01	-.09 *	.18 **																			
	Real Team	3.57	.60			.01	.12	.07	.13																			
6. Physical Exertion	No Team	3.53	1.19	.003 (.01)	5.7 (2, 918)	-.17 **	-.02	-.13 **	-.01	.40 **																		
	Pseudo Team	3.39	1.14			-.14**	-.02	-.11 **	.02	.38**																		
	Real Team	3.06	1.22			.05	.08	.07	-.16	.36**																		

** Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed). ± Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988).

±± Levene's Test >0.05 Homogeneity of Variances Not Violated (except for co-worker support). ±±± Robust tests for equality of means: Welsh and Brown-Forsythe Tests.

Table 8.11: ....continued

Variable	Team Structure	$\bar{x}$	SD	Pvalue (Effect Size)±	F (df)±±	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
7. Quantitative Workload	No Team	3.88	.942			-.10**	.02	-.06	.05	.67**	.43**																	
	Pseudo Team	3.75	1.02	.209 (.00)	1.6 (2, 918)	-.08*	.02	-.05	.09*	.66**	.42**																	
	Real Team	3.69	.949			-.01	.17	.08	.04	.67**	.34**																	
8. Qualitative Workload	No Team	1.99	.879			-.09**	-.08**	-.10**	-.07*	.28**	.17**	.34**																
	Pseudo Team	1.93	.859	.258 (.00)	1.4 (2, 918)	-.05	-.06	-.07	-.03	.29**	.16**	.37**																
	Real Team	1.82	.87			-.05	-.02	-.05	-.07	.32**	.7**	.37**																
9. Nature of Work	No Team	3.25	.66			-.18**	-.03	-.14**	.01	.74**	.75**	.82**	.59**															
	Pseudo Team	3.17	.66	.026 (.01)	3.7 (2, 918)	-.14**	-.02	-.12**	.07	.74**	.73**	.83**	.60**															
	Real Team	3.03	.68			.01	.11	.06	-.06	.71**	.78**	.76**	.68**															
10. Total Mean Score Organizational Constraints	No Team	3.16	.71			-.36**	-.25**	-.39**	-.06	.45**	.24**	.34**	.40**	.46**														
	Pseudo Team	3.08	.67	.001 (.02)	6.6 (2, 918)	-.37**	-.24**	-.41**	-.02	.45**	.19**	.34**	.37**	.44**														
	Real Team	2.87	.67			-.13	-.14	-.17	.02	.36**	.18*	.24**	.46**	.39**														
11. Total Mean Score Inter-personal Conflict at Work Scale	No Team	.31	.15			-.21**	-.27**	-.30**	-.12**	.25**	.24**	.18**	.28**	.32**	.43**													
	Pseudo Team	.31	.14	.052 (.01)	3.0 (2, 918)	-.20**	-.21**	-.27**	-.10*	.24**	.23**	.20**	.26**	.31**	.43**													
	Real Team	.28	.15			.02	-.08	-.03	-.08	.21*	.34**	.09	.46**	.39**	.47**													
12. Incidents at Work	No Team	2.06	.95			-.13**	-.09**	-.15**	-.10**	.20**	.46**	.20**	.22**	.39**	.24**	.24**												
	Pseudo Team	2.00	.84	.053 (.01)	2.9 (2, 918)	-.08	-.08*	-.11**	-.06	.14**	.46**	.19**	.19**	.37**	.17**	.25**												
	Real Team	1.82	.78			.03	.00	.03	-.17	.37**	.47**	.20*	.31**	.46**	.27**	.38**												

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed). ± Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988).
±± Levene's Test >0.05 Homogeneity of Variances Not Violated.

Table 8.11: ....continued

Variable	Team Structure	$\bar{x}$	SD	Pvalue (Effect Size)±	F (df)±±	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
13. Move to New Hospital Site	No Team	2.64	.87		2.4	-.09**	-.05	-.09**	-.11**	.10**	.17**	.13**	.18**	.20**	.20**	.16**	.20**											
	Pseudo Team	2.49	.83	.096 (.01)	(2, 918)	-.06	-.02	-.05	-.08*	.07	.17**	.13**	.18**	.20**	.18**	.15**	.20**											
	Real Team	2.45	.86			-.10	-.14	-.15	-.04	-.06	.02	-.09	-.02	-.03	-.04	.07	.17											
14. Total Mean Composite Score of Work Stressors	No Team	.67	3.83		6.3	-.29**	-.17**	-.30**	-.07*	.67**	.56**	.64**	.60**	.83**	.78**	.57**	.43**	.43**										
	Pseudo Team	.07	3.68	.002 (.01)	(2, 918)	-.26**	-.14**	-.27**	-.02	.67**	.54**	.66**	.59**	.83**	.77**	.57**	.39**	.43**										
	Real Team	-.92	3.72			-.04	-.02	-.04	-.04	.61**	.57**	.56**	.72**	.82**	.72**	.65**	.56**	.19*										
15. Job Satisfaction	No Team	3.11	.68		34.0	.60**	.39**	.63**	.40**	-.21**	-.18**	-.14**	-.17**	-.24**	-.46**	-.31**	-.25**	-.11**	-.40**									
	Pseudo Team	3.19	.73	.000 (.07)	(2, 918)	.55**	.35**	.60**	.39**	-.19**	-.15**	-.13**	-.13**	-.20**	-.46**	-.31**	-.21**	-.11**	-.39**									
	Real Team	3.76	.59			.56**	.21*	.52**	.26**	-.12	-.02	-.07	-.12	-.10	-.24**	-.07	-.04	.16	-.14									
16. Intention to Leave Job	No Team	2.90	1.20		9.1	-.27**	-.18**	-.28**	-.13**	.21**	.11**	.17**	.18**	.22**	.32**	.22**	.19**	.08**	.31**	-.39**								
	Pseudo Team	2.61	1.19	.000 (.02)	(2, 918)	-.26**	-.12**	-.25**	-.08*	.17**	.08*	.15**	.11**	.17**	.28**	.15**	.15**	.08*	.24**	-.37**								
	Real Team	2.28	1.19			-.13	-.21*	-.21*	-.14	.28**	.16	.14	.45**	.32**	.48**	.35**	.27**	-.06	.51**	-.36**								
17. Emotional Exhaustion	No Team	3.20	.96		5.9	-.28**	-.18**	-.30**	-.07*	.51**	.34**	.42**	.35**	.53**	.52**	.35**	.32**	.20**	.62**	-.46**	.50**							
	Pseudo Team	3.08	.93	.003 (.01)	(2, 918)	-.25**	-.14**	-.27**	-.05	.50**	.30**	.42**	.35**	.52**	.53**	.37**	.29**	.20**	.62**	-.45**	.47**							
	Real Team	2.81	.95			-.13	-.10	-.14	.01	.55**	.40**	.40**	.57**	.62**	.49**	.45**	.38**	-.03	.68**	-.33**	.54**							
18. Depersonali-zation	No Team	.34	.15		7.3	-.09**	-.12**	-.13**	-.06	.20**	.16**	.17**	.43**	.32**	.34**	.30**	.20**	.20**	.41**	-.20**	.26**	.45**						
	Pseudo Team	.31	.16	.001 (.02)	(2, 918)	-.04	-.06	-.06	-.03	.20**	.13**	.21**	.48**	.33**	.34**	.33**	.20**	.18**	.43**	-.18**	.18**	.45**						
	Real Team	.27	.16			-.08	-.13	-.13	-.05	.25**	.27**	.13	.48**	.38**	.31**	.37**	.20*	.07	.44**	-.11	.40**	.52**						

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed). ± Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988).
±± Levene's Test >0.05 Homogeneity of Variances Not Violated.

Table 8.11: ....continued

Variable	Team Structure	x	SD	Pvalue (Effect Size)±	F (df)±±	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
19. Personal Accomplishment	No Team	3.45	.74	.000 (.04)	18.8 (2, 918)	.06	.11**	.10**	.30**	.08**	.01	.04	-.11**	.00	-.00	-.05	-.04	-.14**	-.07*	.13**	-.06*	-.03	-.22**					
	Pseudo Team	3.67	.66			.03	.08*	.07	.28**	.09*	.00	.04	-.13**	-.00	-.02	-.04	-.00	-.17**	-.08*	.09*	-.02	-.05	-.28**					
	Real Team	3.95	.67			.17	-.05	.09	.29**	.10	.08	.09	.14	.14	.22*	.16	.12	-.10	.18*	.23*	.03	.14	-.03					
20. Maslach Burnout Inventory	No Team	6.69	1.46	.000 (.03)	11.4 (2, 918)	-.23**	-.19**	-.27**	-.12**	.41**	.28**	.35**	.46**	.49**	.50**	.38**	.32**	.24**	.60**	-.41**	.45**	.87**	.81**	-.26**				
	Pseudo Team	6.34	1.52			-.17**	-.13**	-.20*	-.09*	.39**	.25**	.36**	.49**	.49**	.50**	.40**	.29**	.23**	.62**	-.39**	.38**	.86**	.82**	-.29**				
	Real Team	5.82	1.54			-.14	-.13	-.17	-.06	.45**	.39**	.29**	.59**	.57**	.42**	.46**	.33**	.02	.62**	-.28**	.52**	.89**	.82**	-.06				
21. Total Composite Score Psychological Strains	No Team	.23	.60	.000 (.07)	32.8 (2, 918)	-.40**	-.30**	-.45**	-.30**	.33**	.24**	.27**	.39**	.40**	.51**	.38**	.32**	.23**	.56**	-.68**	.69**	.76**	.66**	-.43**	.87**			
	Pseudo Team	.01	.63			-.35**	-.23**	-.39**	-.26**	.31**	.21*	.28**	.38**	.39**	.51**	.38**	.27**	.22**	.55**	-.66**	.65**	.77**	.66**	-.44**	.87**			
	Real Team	-.39	.60			-.32**	-.20*	-.33**	-.23*	.36**	.27**	.22*	.50**	.43**	.42**	.36**	.27**	-.01	.53**	-.61**	.73**	.74**	.69**	-.34**	.85**			
22. Physiological Strains	No Team	5.27	3.11	.149 (.00)	1.9 (2, 918)	-.09**	-.12**	-.13**	-.05	.19**	.20**	.17**	.20**	.26**	.26**	.25**	.30**	.14**	.34**	-.20**	.20**	.37**	.18**	-.06*	.34**	.32**		
	Pseudo Team	5.37	3.29			-.09*	-.15**	-.14**	-.08*	.15**	.18**	.14**	.16**	.22**	.25**	.24**	.33**	.16**	.31**	-.22**	.21**	.36**	.18**	-.07	.33**	.3**		
	Real Team	4.71	3.43			.11	.01	.08	-.01	.34**	.30**	.27**	.37**	.42**	.22*	.34**	.34**	.01	.45**	-.04	.20*	.50**	.24**	.07	.44**	.30**		
23. Psychological well-being	No Team	2.22	.67	.007 (.01)	5.0 (2, 918)	-.11**	-.14**	-.16**	-.06*	.16**	.12**	.10**	.22**	.20**	.25**	.25**	.25**	.18**	.32**	-.21**	.25**	.41**	.28**	-.18**	.42**	.41**	.51**	
	Pseudo Team	2.08	.64			-.08*	-.08*	-.11**	-.04	.14**	.11**	.09*	.23**	.19**	.23**	.22**	.27**	.20**	.30**	-.22**	.23**	.42**	.31**	-.14**	.44**	.42**	.54**	
	Real Team	1.99	.62			.03	.00	.02	-.13	.23*	.16	.11	.22*	.22*	.24**	.26**	.30**	.20*	.41**	-.01	.25**	.41**	.19*	-.12	.36**	.33**	.57**	
24. Total 6 month April - September 2005 Sick Leave	No Team	4.31	5.97	.395 (.00)	.9 (2, 918)	-.05	-.01	-.04	-.05	.06*	.07*	.04	.01	.06*	.07*	.06*	.12**	.07*	.09**	-.09**	.06*	.10**	.03	-.02	.07*	.09**	.11**	.08**
	Pseudo Team	5.27	8.27			-.07	-.01	-.05	-.02	.03	.08*	.03	-.02	.05	.03	-.01	.12**	.07	.05	-.08*	.05	.11**	-.01	-.03	.07	.08*	.11**	.13**
	Real Team	5.05	10.1			-.01	.04	.01	-.19*	.03	.13	.03	.08	.10	.14	.31**	.31**	.09	.24*	-.09	.15	.06	.01	-.06	.04	.12	.07	.03

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed). ± Effect sizes: .14=large effect; .06=moderate effect; .01=small effect (Cohen, 1988).

±± Levene's Test >0.05 Homogeneity of Variances Not Violated.

Despite achieving significant *p* values for the majority of variables, these do not provide the strength of association, which requires the calculation of *the effect size* using *eta squared* (Table 8.11). The strength varies from small to more than medium effect (Cohen, 1988). The findings in study one indicating that those in pseudo teams had lower levels of job satisfaction and higher levels of intention to leave job than those that did not work in a team at all is not replicated in study two. For all the variables that showed statistically significant differences between means across team structure, those in pseudo team fared midway between those in real team and those in no team, except for one, namely physiological strains, whereby those in pseudo team had the highest mean.

The next section includes the findings of testing the four groups of hypotheses of study two.

8.3 Hypotheses Testing

As discussed in chapter five, study two has four groups of testable hypotheses. In the analysis and also in the presentation of results, I will first focus on the macro-picture that includes the second-order factors/composite scores.

I will then focus on the detailed relationships involving single dimensions/factors/scales. At the same time, I will be presenting the results of the hypothesised hierarchical linear relationships using HLM version 6.03, and of multilevel structural equation modelling using Mplus® version 4.02.

8.3.1 Hypotheses Group One

Unit-Levels of Transformational Leadership and Team Climate Are Associated with Unit-Level Climate for Social Support and Decision Latitude/Control across Hospital Units.

Multilevel analysis allows for the fact that transformational leadership and team climate might have different prediction capabilities, which is to say regression coefficients, depending on the hospital unit, in which the hospital employee works. As discussed in chapter seven, transformational leadership and team climate, intended at level two of analysis, could be justifiably aggregated. On the other hand, this group of hypotheses models social support and decision latitude/control as unit-level climates. This is justified based on the $r_{wg\ (j)}$ indices, the significant *F*-ratios of *ICC(1)*, and the *ICC(2)* values above 0.6. Apart from the demographic variables as control variables, I will also be controlling for psychological well-being of unit members, as this is likely to influence the way respondents perceive their social environment. This influence can be explained by means of the mechanism of emotional contagion, which is the unconscious mimicking of feelings occurring as part of group dynamics and collective behaviour (Scherer, 2001). Thus controlling for it is likely to provide a more conservative prediction.

Hierarchical Linear Modelling

As described in chapter seven, HLM analysis involves several steps (Raudenbush & Bryk, 2002). **First**, the **unconditional models** determine whether there is sufficient variability in the outcome measures across units. In this group of hypotheses, the outcome variables are the moderator variables and include: total social support, and decision latitude/control. The unconditional model has the form:

<u>Individual-level:</u> Outcome Variable (MODERATOR VARIABLE) $= \beta_{0j} + r_{ij}$ (8.1)

<u>Unit-level:</u> $\beta_{0j} = \gamma_{00} + u_{0j}$ (8.2)

Table 8.12 shows the output from the unconditional hierarchical models for total social support, its two components, as well as for decision latitude/control. The tests of (γ_{00}) **shows** that the grand mean total social support and decision latitude/control are significantly different from zero. The variance components (τ_{00}) of the unit-level model residuals (u_{0j}) indicate that there is statistical evidence of between-unit variability for the outcome variables above, to justify continuation of the hierarchical model building process.

Table 8.12
Unconditional Hierarchical Models for Social Support and for Decision latitude/Control

Outcome Variable	*FIXED EFFECT*	*Coefficient*	*SE*	*t-ratio*	*p-value*
Social Support (TSS)	**TSS Mean (γ_{00})**	**3.521**	**.032**	**110.95**	**0.000**
Decision Latitude/Control (DLC)	**DLC Mean (γ_{00})**	**56.877**	**.034**	**167.43**	**0.000**
Outcome Variable	*RANDOM EFFECT*	*Variance Component (τ_{00})*	*df*	χ^2	*p-value*
Social Support	**TSS Mean (u_{0j})**	**.081**	**135**	**393.57**	**0.000**
Decision Latitude/Control	**DLC Mean (u_{0j})**	**8.611**	**135**	**330.23**	**0.000**

The **intraclass correlation coefficients** – *ICC* (ρ) for **the unconditional models**, with σ^2 being the level-1 variance, can be calculated using the formula 8.3:

$$\hat{\rho} = \frac{\hat{\tau}_{00}}{\hat{\tau}_{00} + \hat{\sigma}^2} \tag{8.3}$$

ICC for social support is 0.21, which indicates that approximately 21 % of the total variance in scores of total social support resides between units. *ICC* for decision latitude/control is 0.18 (18% of variance of decision latitude/control resides between units). The Chi-square tests indicate that these between-unit variances are significant, which is to say that the intercept terms significantly vary across units. To gauge **the magnitude of the variation among units** in their mean levels for social support and decision latitude/control, one can calculate ranges of plausible values for these means, under the normality assumption using the equation: $\gamma_{00} \pm 1.96\ (\tau_{00})^{1/2}$. Therefore, 95% of the following between-unit means fall within the range: for total social support – (2.97, 4.08); and for decision latitude/control – (51.13, 62.63).

The **second step** involves analysing the **random coefficient regression models** (Table 8.13).

Table 8.13 Random Coefficient Regression Models of the Relationships involving Social Support and Decision Latitude/Control

FIXED EFFECT	***Coefficient***		***Standard Error***		***T-Ratio***		***P-Value***	
Outcome Variable	TSS	DLC	TSS	DLC	TSS	DLC	TSS	DLC
TSS Mean(γ_{00})	3.55		.03		110.5		.000	
DLC Mean(γ_{00})		57.10		.33		172.42		.000
Sex (γ_{10})	.11	.07	.05	.60	2.46	.11	.016	.913
Age (γ_{20})	-.03	-.44	.03	.40	-.87	-1.09	.385	.279
Marital Status (γ_{30})	-.05	-.44	.04	.45	1.41	-0.98	.161	.331
Employment Contract (γ_{40})	.00	-.28	.04	.45	.00	-.63	.999	.530
Duration in Health Care(γ_{50})	-.00	.13	.00	.05	-.47	2.81	.639	.006
Duration in Unit(γ_{60})	-.00	.01	.00	.05	-.91	.26	.367	.797
Professional Group (γ_{70})	.02	-.39	.02	.18	.70	-2.17	.486	.062
Well-Being (γ_{80})	-.08	-.48	.03	.42	-2.72	-1.15	.008	.255

RANDOM EFFECT	***Variance Component(τ_{00})***		***Ch-Square/df 7***		***P-Value***	
Outcome Variable	TSS	DLC	TSS	DLC	TSS	DLC
TSS Mean (u_{0j})	.06		8.96		.255	
DLC Mean (u_{0j})		5.76		4.19		>.500
Sex (u_{1j})	.03	10.70	6.70	11.61	>.500	.114
Age (u_{2j})	.01	2.53	9.02	3.65	>.250	>.500
Marital Status(u_{3j})	.01	2.92	1.76	3.59	>.500	>.500
Employment Contract (u_{4j})	.01	1.27	7.65	3.15	.364	>.500
Duration in Health Care(u_{5j})	.00	.03	10.45	5.08	.164	>.500
Duration in Unit(u_{6j})	.00	.03	10.30	12.53	.172	.084
Prof Group (u_{7j})	.01	.60	8.11	4.85	.323	>.500
Well-Being (u_{8j})	0.01	5.40	12.04	11.26	.099	.127
Sigma Squared	.29	30.41				

Note. Chi-square statistics are based on only 8 of 136 units that had sufficient data for computation (*due to lack of between group variability of control variables*). **Fixed effects and variance components** are based on **all the data.**

The "least squares" estimates of fixed effects are the OLS regression results. The random coefficient regression models identified several of the control variables for deletion based upon criteria established by Raudenbush and Bryk (2002), namely non-significant *t*-ratio statistic for each of the regression coefficients, as well as lack of between-groups' variability (Var[β_j] = 0). Hence, the only demographic control variables that were inserted for the final model were gender and *well-being* for TSS and duration in health care for DLC.

The **third step** involves estimation of the **intercept-as-outcome models**. The equations are shown in 8.4 and 8.5a, b, and c. A given hospital unit's (j) average total social support/decision latitude control (β_{0j}) is allowed to vary across hospital units. To allow for the hospital units to have different intercepts, the intercept term (β_{0j}) needs to be decomposed into a group average (called the grand mean, symbolised as (γ_{00})) and a group deviation symbolized as (u_{0j}).

<u>Level 1 Equation</u>: $Y_{ij} = \beta_{0j} + \beta_{1j}$ (Control Variable) + β_{2j} (Control Variable) + r_{ij} (8.4)

<u>Level 2 Equations</u>:

$\beta_{0j} = \gamma_{00} + \gamma_{01}$ (UNSIZE) + γ_{02} (Unit-Level Predictor) + u_{0j} (8.5a)

$\beta_{1j} = \gamma_{10} + u_{1j}$ (8.5b)

$\beta_{2j} = \gamma_{20} + u_{2j}$ (8.5c)

Where (γ_{00}) is the grand mean for every hospital staff member in every hospital unit (j) and (u_{0j}) is the main effect for hospital unit (j), which is to say, how much hospital unit (j) deviates from the grand mean. When (γ_{00}) and (u_{0j}) combine, they form the average score on the total social support/decision latitude control for unit (j). Because I am trying to predict the average total social support/decision latitude control for a given hospital unit, these are technically known as an **<u>intercept-as-outcomes models</u>**. The hypotheses for group one will test whether shared transformational leadership/team climate is predictive of the between-units variance in unit-level climate for total social support/decision latitude control.

The first hypothesis to test is **Hypothesis 1a**:

Unit-level transformational leadership is positively related to the unit-level climate for total social support across hospital units.

Table 8.14 shows the results of the intercept-as-outcome model for the prediction of total social support by transformational leadership.

Table 8.14: Intercept-as-Outcome Models - Transformational Leadership (Unit-Level Predictor) and Total Social Support (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
TSS Mean (γ_{00})	2.29	0.17	13.66	131	0.000
Unit Size (γ_{01})	-0.00	0.00	-0.90	131	0.378
Transformational Leadership (γ_{02})	0.43	0.05	8.56	131	0.000
For Sex Slope β_1					
Intercept, (γ_{10})	0.11	0.05	2.47	133	0.015
For Well-being Slope β_2					
Intercept, (γ_{20})	-.07	.03	-2.20	133	0.029
Random Effect	*Standard Deviation*	*Variance Component* (τ_{00})	*Chi-square*	*d.f.*	*P-value*
TSS Mean (μ_0)	0.20	0.04	148.29	65	0.000
Sex Slope μ_1	0.10	0.01	101.38	67	0.053
Well-being Slope μ_2	0.08	0.01	59.64	67	>.500
Sigma Squared r_{ij}	0.54	0.29			

Random level-1 coefficient	*Reliability estimate*
For Intercept β_0	0.347
For Sex Slope β_1	0.073
For Well-being Slope β_2	0.049

Note: The chi-square statistics and reliability estimates reported above are based on only 68 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

The result of this test yielded a statistically significant regression (γ_{02} = .43, SE = 0.05, t (131) = 8.56). Therefore, across the hospital units, the average unit members' total social support is higher with higher unit-level measures of shared transformational leadership. The Chi-square test for TSS indicated that after including transformational leadership as a level-two predictor, there was still significant variance in the intercept across units. It is noteworthy that the between hospital units variance has dropped from

0.08 to 0.04 from step one to step three. Using the formula $(\tau_u - \tau_c)/\tau_u$, where τ_u is variance between hospital units in the unconditional model and τ_c is the variance between hospital units in the conditional model, gives 0.51 as the proportion of variance between hospital units explained by the model with Shared Transformational Leadership in it.

The conditional intraclass correlation, which is the amount of the total variance that is due to the between units variance after controlling for various independent variables is (0.04/ (0.04+0.29) = 0.121 or 12.1 %. The γ_{10} and γ_{20} parameters (pooled level one slopes across level two units), for *gender* and *well-being* respectively, are statistically significant namely, (γ_{10} = .11, SE = 0.05, t (133) = 2.47, p = 0.02) and (γ_{20} = -.07, SE = 0.03, t (133) = -2.20, p = 0.03). Therefore, the relationships between the unit members' gender and well-being respectively, and their predicted total social support is not the same in all units. Furthermore, the effect size is needed to calculate the magnitude of the regression. This is calculated, as discussed in chapter seven, R^2 for level 2 using Snijders and Bosker (1999) formula:

$$R_2^2 = 1 - \frac{\mathrm{var}\left(\overline{Y}_{.j} - \sum_h \gamma_h \overline{X}_{h.j}\right)}{\mathrm{var}\left(\overline{Y}_{.j}\right)} = 1 - \frac{\dfrac{\hat{\sigma}^2(full)}{B} + \hat{\tau}_0^2(full)}{\dfrac{\hat{\sigma}^2(null)}{B} + \hat{\tau}_0^2(null)} \tag{8.6}$$

R^2 for final model is 0.42; whereas R^2 for intermediate model (with level-1 and level 2 control variables) is 0.08. Therefore R^2 change is 0.34. In summary, the association between shared transformational leadership and average total social support is statistically significant with a large effect size (Cohen, 1988). **Therefore, <u>hypothesis</u>**

1a that unit-level transformational leadership is a significant predictor of the unit-level climate for total social support **is supported.** One must point out that the somewhat large effect size may be due to the close proximity between transformational leadership through its dimension supportive leadership, and total social support through its dimension supervisor support.

The second hypothesis to test is **Hypothesis 1b**:

> Unit-level transformational leadership is positively related to the unit-level climate for decision latitude/control across hospital units.

Table 8.15 shows that the regression of decision latitude/control on transformational leadership is not significant.

Table 8.15
Intercept-as-Outcome Models: Transformational Leadership (Unit-Level Predictor) and Decision latitude/Control (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
DLC Mean (γ_{00})	55.43	2.82	19.68	131	0.000
Unit Size (γ_{01})	.00	.03	.07	131	0.943
Transformational Leadership (γ_{02})	.57	.82	.70	131	0.484
For Years in Health Slope β_1					
Intercept, (γ_{10})	.09	.03	2.48	133	0.015

Random Effect	*Standard Deviation*	*Variance Component (τ_{00})*	*Chi-square*	*d.f.*	*P-value*
DLC Mean (μ_{0j})	2.80	7.83	222.80	119	0.000
Years in Health Slope (μ_{1j})	0.18	0.03	138.86	121	0.128
Sigma Squared r_{ij}	6.09	37.04			

Random level-1 coefficient	*Reliability estimate*
For Intercept β_0	0.383
For Intercept Years in Health β_1	0.163

Note: The chi-square statistics and reliability estimates reported above are based on only 122 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

The result of this test yielded a non-statistically significant regression (γ_{02} = .57, SE = 0.82, t (131) = .70). Therefore, across the hospital units, the average unit members' decision latitude/control does not significantly change with varying levels of unit-level measures of shared transformational leadership. **Therefore <u>hypothesis 1b</u> is <u>not</u> <u>supported</u>**. The result of this still unexplored hypothesised relationship is not as expected. The basis of my proposition is, indeed, based on the transformational leaders' characteristics in successfully creating a positive social environment that would enable employees to exercise more decision-making freedom across hospital units. The γ_{10} parameter (pooled level one slopes across level two units), for *years of duration employed in health care* is statistically significant namely, (γ_{10} = .09, SE = 0.03, t (133) = 2.48, p = 0.02). Therefore, the relationships between the unit members' years of duration employed in health care, and their predicted decision latitude/control is not the same in all units.

The third hypothesis to test is **Hypothesis 1c:**

> Unit-level team climate is positively related to the unit-level climate for total social support across hospital units.

Table 8.16 shows the results of the intercept-as-outcome model for the prediction of social support by team climate. The result of this test yielded a statistically significant regression (γ_{02} = .43, SE = 0.06, *t* (131) = 10.64). Therefore, across the hospital units, the average unit members' total social support is higher with higher unit-level measures of shared team climate. The Chi-square test for TSS indicated that after including team climate as a level-two predictor, there was still significant variance in the intercept across units. The between hospital units variance has dropped from 0.08 to 0.01 from step one to step three. Using the formula $(\tau_u - \tau_c)/\tau_u$, gives 0.88 as the proportion of variance between hospital units explained by the model with shared team climate in it.

Table 8.16
Intercept-as-Outcome Models: Team Climate (Unit-Level Predictor) and Social Support (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
TSS Mean (γ_{00})	2.29	0.03	113.74	131	0.000
Unit Size (γ_{01})	-0.00	0.00	-2.74	131	0.007
Team Climate (γ_{02})	0.43	0.06	10.64	131	0.000
For Sex Slope β_1					
Intercept, (γ_{10})	0.11	0.04	1.93	133	0.055
For Well-being Slope β_2					
Intercept, (γ_{20})	-.07	.03	-2.24	133	.027
Random Effect	***Standard Deviation***	***Variance Component*** (τ_{00})	***Chi-square***	***d.f.***	***P-value***
TSS Mean (μ_{0j})	.12	.01	107.83	65	.001
Sex Slope μ_1	.16	.03	74.74	67	.241
Well-being Slope μ_2	.08	.01	60.85	67	>.500
Sigma Squared r_{ij}	.53	.28			

Random level-1 coefficient	*Reliability estimate*
For Intercept β_0	0.347
For Sex Slope β_1	0.073
For Well-being Slope β_2	0.049

Note: The chi-square statistics and reliability estimates reported above are based on only 68 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

The conditional intraclass correlation, which is the amount of the total variance that is due to the between units variance after controlling for various independent variables is (0.01/ (0.01+0.28) = 0.04 or 4 %. The γ_{10} and γ_{20} parameters (pooled level one slopes across level two units), for *gender* and *well-being* respectively, are statistically significant namely, (γ_{10} = .11, SE = 0.04, t (133) = 1.93, p = 0.05) and (γ_{20} = -.07, SE = 0.03, t (133) = -2.24, p = 0.03). Therefore, the relationships between the unit members' gender and well-being respectively, and their predicted total social support is not the same in all units. Furthermore, the effect size is needed to calculate the magnitude of the regression. R^2 of the final model is 0.67; whereas that of the intermediate model is 0.03, yielding a large R^2 change of 0.64. This result is very similar to that found for hypothesis 1a, and indeed, as in 1a, the large R^2 implies that constructs may be in close proximity of the team climate dimensions to co-worker support.

Therefore, **hypothesis 1c is supported** and that shared team climate yielded a significant effect on the intercept of each unit's total social support. The result is as expected and in line with evidence from British NHS hospitals, namely, that those working in well-functioning teams reported higher levels of social support (Borrill et al., 2001).

The fourth hypothesis to test is **Hypothesis 1d:**

> Unit-level team climate is positively related to the unit-level climate for decision latitude/control across hospital units.

Table 8.17 shows the results of the intercept-as-outcome model. The result of this test yielded a statistically significant regression (γ_{02} = 2.07, SE = 0.95, t (131) = 2.19). Therefore, across the hospital units, the average unit members' decision latitude/control is higher with higher unit-level measures of shared team climate. The Chi-square test for DLC indicated that after including team climate as a level-two predictor, there was still significant variance in the intercept across units. The between hospital units variance has dropped from 8.61 to 7.04 from step one to step three. Using the formula $(\tau_u - \tau_c)/\tau_u$, gives 0.18 as the proportion of variance between hospital units explained by the model with shared team climate in it.

Table 8.17
Intercept-as-Outcome Models: Team Climate (Unit-Level Predictor) and Decision Latitude/Control (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
DLC Mean (γ_{00})	**57.21**	**0.60**	**95.33**	**131**	**0.000**
Unit Size (γ_{01})	**-0.00**	**0.02**	**-0.11**	**131**	**0.914**
Team Climate (γ_{02})	**2.07**	**0.95**	**2.19**	**131**	**0.030**
For Years in Health Slope β_1					
Intercept (γ_{10})	**0.09**	**0.04**	**2.56**	**133**	**0.012**
Random Effect	***Standard Deviation***	***Variance Component (τ_{00})***	***Chi-square***	***d.f.***	***P-value***
DLC Mean (μ_0)	**2.65**	**7.04**	**213.37**	**119**	**0.000**
Years in Health Slope μ_1	**0.16**	**0.03**	**138.69**	**121**	**0.130**
Sigma Squared r_{ij}	**6.09**	**37.10**			

Random level-1 coefficient	***Reliability estimate***
For Intercept β_0	**0.37**
For Years in Health Slope β_1	**0.15**

Note: The chi-square statistics and reliability estimates reported above are based on only 122 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

The conditional intraclass correlation, which is the amount of the total variance that is due to the between units variance after controlling for various independent variables is (7.04/ (7.04+37.10) = 0.16 or 16%. The γ_{10} parameter (pooled level one slopes across level two units), for *duration in health care employment* is statistically significant namely, (γ_{10} = .09, SE = 0.04, t (133) = 2.56, p = 0.01). R^2 of the final model is of 0.07, whereas that of the intermediate model is 0.02. This yields an R^2 change of 0.05. Therefore **hypothesis 1d is supported**, with a small effect size.

The fifth hypothesis to test is **Hypothesis 1e:**

> Unit-level measures of shared transformational leadership and team climate are positively related to the average unit staff members' total social support across hospital units.

Table 8.18 shows the results of the intercept-as-outcome model. The results of this test yielded statistically significant regressions for transformational leadership (γ_{02} = .22, SE = 0.05, *t* (130) = 4.32) and for team climate (γ_{03} = .50, SE = 0.07, *t* (130) = 7.09). Therefore, across the hospital units, the average unit members' total social support is higher with higher unit-level measures of shared transformational leadership and team climate. The Chi-square test for TSS indicated that after including transformational leadership and team climate as level-two predictors, there was still significant variance in the intercept across units. The between hospital units variance drop from 0.08 to 0.01 from step one to step three, is the same as for hypothesis 1c.

Table 8.18
Intercept-as-Outcome Models: Transformational Leadership and Team Climate (Unit-Level Predictors) and Social Support (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
TSS Mean (γ_{00})	2.93	0.16	17.95	130	0.000
Unit Size (γ_{01})	-0.00	0.00	-1.46	130	0.146
Transformational Leadership (γ_{02})	0.22	0.05	4.32	130	0.000
Team Climate (γ_{03})	0.50	0.07	7.09	130	0.000
For Sex Slope β_1					
Intercept, (γ_{10})	0.08	0.04	2.00	133	0.047
For Well-being Slope β_2					
Intercept, (γ_{20})	-0.06	0.03	-2.09	133	0.038
Random Effect	*Standard Deviation*	*Variance Component* (τ_{00})	*Chi-square*	*d.f.*	*P-value*
TSS Mean (μ_{0j})	0.09	0.01	95.84	64	0.006
Sex Slope μ_1	0.14	0.02	74.58	67	0.245
Well-being Slope μ_2	0.07	0.01	60.78	67	>.500
Sigma Squared r_{ij}	0.53	0.28			

Random level-1 coefficient	*Reliability estimate*
For Intercept β_0	0.114
For Sex Slope β_1	0.078
For Well-being Slope β_2	0.041

Note: The chi-square statistics and reliability estimates reported above are based on only 68 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

The conditional intraclass correlation, which is the amount of the total variance that is due to the between units variance after controlling for various independent variables is

(0.01/ (0.01+0.28) = 0.04 or 4%. The γ_{10} and γ_{20} parameters (pooled level one slopes across level two units), for *gender* and *well-being* respectively, are not statistically significant, therefore, the relationships between the unit members' two level one predictors and their predicted total social support do not vary across units when both level two predictors are inserted in the same regression equations. R^2 of the final model is 0.67; whereas that of the intermediate model is 0.08, yielding an R^2 change of 0.59. Therefore, **hypothesis 1e** is **supported** with a large effect size (Cohen, 1988). This result is as expected and reinforces the findings for hypotheses 1a and 1c.

The sixth hypothesis to test is **Hypothesis 1f:**

> Unit-levels of transformational leadership and team climate are positively related to the unit-level climate for decision latitude/control across hospital units.

Table 8.19 shows the results of the intercept-as-outcome model. As for hypothesis 1e, this model includes both constructs, namely, transformational leadership and team climate, which are inserted in the same regression equation. The results yielded non-statistically significant regression for transformational leadership and statistically significant regression for team climate (γ_{03} = 2.28, SE = 0.90, *t* (130) = 2.53). Therefore, across the hospital units, the average unit members' decision latitude/control is higher with higher unit-level measures of shared team climate. The Chi-square test for DLC indicated that after including transformational leadership and team climate as level-two predictors, there was still significant variance in the intercept across units. The between hospital units variance drop from 8.61 to 7.09 from step one to step three. Using the formula $(\tau_u - \tau_c)/\tau_u$, gives 0.18 as the proportion of variance between hospital units explained by the model with shared team climate in it.

Table 8.19
Intercept-as-Outcome Models: Transformational Leadership and Team Climate (Unit-Level Predictor) and Decision Latitude/Control (Outcome Variable)

Fixed Effect	*Coefficient*	*Standard Error*	*T-ratio*	*d.f.*	*P-value*
For Intercept β_0					
DLC Mean (γ_{00})	58.50	2.59	22.63	130	0.000
Unit Size (γ_{01})	-0.01	0.02	-0.22	130	0.826
Transformational Leadership (γ_{02})	-0.42	0.77	-0.54	130	0.588
Team Climate (γ_{03})	2.279	0.90	2.53	130	0.013
For Years in Health Slope β_1					
Intercept (γ_{10})	0.09	0.03	2.60	133	0.011
Random Effect	*Standard Deviation*	*Variance Component*	*Chi-square*	*d.f.*	*P-value*
DLC Mean (μ_{0j})	2.66	7.09	212.46	118	0.000
Years in Health Slope μ_1	0.16	0.03	138.65	121	0.130
Sigma Squared r_{ij}	6.09	37.13			

Random level-1 coefficient	*Reliability estimate*
For Intercept β_0	0.369
For Years in Health Slope β_1	0.147

Note: The chi-square statistics and reliability estimates reported above are based on only 122 of 134 units that had sufficient data for computation. **Fixed effects and variance components** are based on **all the data.**

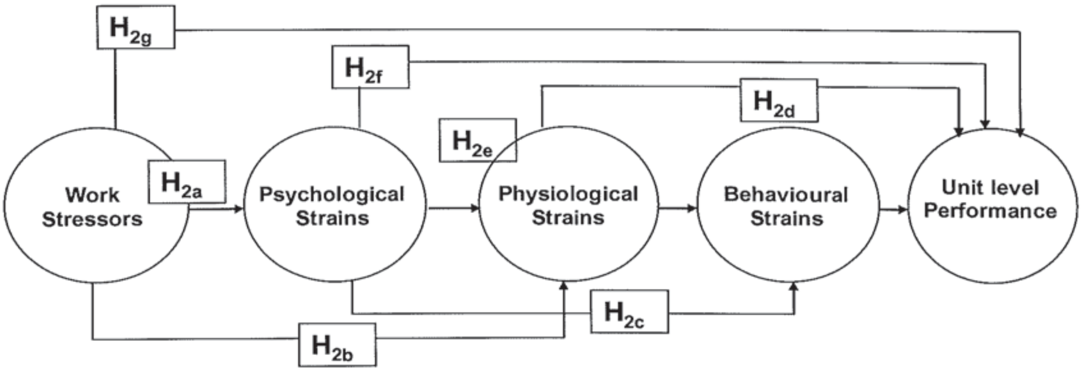
The conditional intraclass correlation, which is the amount of the total variance that is due to the between units variance after controlling for various independent variables is (7.09/ (7.09+37.13) = 0.16 or 16%. The γ_{10} parameter (pooled level one slopes across level two units), for *duration in health care employment* is statistically significant namely, (γ_{10} = .09, SE = 0.03, t (133) = 2.60, p = 0.01). R^2 of the final model is 0.07; whereas that of the intermediate model is 0.02. This yields an R^2 change of 0.05. Therefore **hypothesis 1f** is **supported**, thereby confirming hypothesis 1d. Consequently, for this specific sample, decision latitude/control appears to be a function of team climate but not of transformational leadership.

In summary, the first group of hypotheses, except for hypothesis 1b, can be accepted. Hypothesis 1a, which stated that unit-level transformational leadership is positively related to the unit-level climate for total social support across hospital units, was supported. However, unit-level transformational leadership did not predict unit-level climate for decision latitude/control; therefore hypothesis 1b was not supported. Hypotheses 1c and 1d were supported, namely that average unit staff members' social support and decision latitude/control, were predicted by the higher-level team climate. Hypotheses 1e and 1f were also supported when both unit-level measures of transformational leadership and team climate were inserted in the two regression equations in predicting average unit staff members' social support and decision latitude/control.

8.3.2 Hypotheses Group Two: Hospital Employees' Work Stressor-to-Strain Relationships Are Associated with Externally-Rated Unit-Level Performance

Figure 8.5 (next page) illustrates the second group of hypotheses, modelled at the hospital unit member level. As discussed in chapter seven, this group of hypotheses deals with mediated relationships, in which psychological strains mediate the relationships between work stressors and physiological strains, which, in turn, mediate the relationship between psychological strains and behavioural strains. Finally, physiological strains and behavioural strains mediate the relationships between psychological strains and hospital unit performance on the one hand, and physiological strains and hospital unit performance on the other. Although there are a number of studies in the occupational research domain on the work stressor-strain relationships, only a few adopted a multilevel approach similar to that adopted by Bliese and Britt (2001), and none adopted the format illustrated in Figure 8.5.

Figure 8.5: Hypotheses Group Two



Hypothesis 2a: Main effects work stressors to psychological and physiological strains.
Hypothesis 2b: Mediation of psychological strains in the work stressors-to-physiological strains link.
Hypothesis 2c: Mediation of physiological strains in the psychological strains-to-behavioural strains link.
Hypothesis 2d: Mediation of behavioural strains in the physiological strains-to-hospital unit performance link.
Hypothesis 2e: Mediation of physiological strains in the psychological strains-to-hospital unit performance link.
Hypothesis 2f: Mediation of psychological strains in the work stressors-to-hospital unit performance link.
Hypothesis 2g: Work stressors-to-hospital unit performance link, mediated by psychological strains, physiological strains, and behavioural strains.

The first hypothesis in group two is:

Hypothesis 2a:

Hospital employees' work stressors are positively associated with their psychological and physiological strains.

The level-1 equations include the control variables: age, gender, marital status, professional group, duration in health care, and duration in the hospital unit. Unit size is also a control variable, but since this is a global construct, it is inserted in the level-2 equation with β_{0j} as the outcome variable.

Individual $Y_{ij} = \beta_{0j} + \beta_{1j}$ (WORK STRESSORS) + β_{2j} (Control Variable) +…+ β_{x_j} (Control Variable) + r_{ij} (8.7)

Group $\beta_{0j} = \gamma_{00} + \gamma_{01}$ (UNSIZE) + u_{0j} (8.8a)

$\beta_{1j} = \gamma_{10} + u_{1j}$ (8.8b)

$\beta_{2j} = \gamma_{20} + u_{2j}$ (8.8c)

$\beta_{xj} = \gamma_{x0} + u_{xj}$

All control and independent variables have been standardised in the same way as those entered in the two-way and three-way interactions in the third group of hypothesised relationships. Tables 8.20 and 8.21 show summaries of regression analyses whose intent is to test for main effects of independent variables (work stressors), and of moderators (social support and decision latitude/control) on psychological strains and physiological strains respectively.

All the main effects are statistically significant, except for the regression of psychological strains on quantitative workload, and the regression of physiological strains on psychological demands, quantitative workload, organisational change, supervisor support as well as on decision latitude/control. Therefore, **hypothesis 2a** is **supported**, except for the relationships involving specific dimensions, mentioned above. These findings are as expected, and in line with the published literature on work stressor-to-strain relationships, as discussed in chapter two. The results throw more light on the conceptualisation of the various dimensions within the construct *nature of work*, which, to my knowledge, has never been explored in its entirety in one study. Indeed, there appears to be no statistically significant main effects of the quantitative nature of work, in terms of pace and volume, on both psychological and physiological strains. Otherwise, all the other work stressors in the study appear to show statistically significant main effects on psychological strains. Moreover, there appears to be no statistically significant main effects of psychological demands on physiological strains.

Table 8.20: Summary of Regression Analyses Involving Main Effects for Independent Variables and Moderators in the Stressor-to-Strain Relationships for Predicting Psychological Strains

Variable	Model 1: Null			Model 2: Intermediate		Model 3: Main Effects (Independent Variables)				Model 3: Main Effects (Moderators)				p<.05	ΔR^2	F^2 *
	γ_{00}	SE	σ^2	γ_{00}	SE	γ_{00}	γ	SE	σ^2	γ_{00}	γ	SE	σ^2			
Outcome Variable: Psychological Strains Composite	-.01	.03	.36													
Intermediate Model With All Control Variables																
Constant				(γ_{00}) -.04	.04									.358		
Age				(γ_{10}) -.05	.03									.076		
Gender				(γ_{20}) -.07	.02									.003		
Marital Status				(γ_{30}) .02	.02									.292		
Employment Contract				(γ_{40}) -.04	.02									.045		
Professional Group				(γ_{50}) -.05	.03									.089		
Years Health Care				(γ_{60}) -.06	.03									.066		
Years in Unit				(γ_{70}) -.01	.02									.832		
Level-2 Unit Size				(γ_{01}) .00	.00									.171		
σ^2 for Model 2				.33												
Main Effects																
Work Stressor Composite (WStres)						-.05	.35	.02	.25					.000	.23	.33
Nature of Work Composite (NOW)						-.06	.24	.02	.28					.000	.14	.18
Psychological Demands (PsyD)							(γ_{70}) .12	.03						.000		
Physical Demands (PhysD)						-.08	(γ_{80}) .08	.03	.23					.006		
Quantitative Workload (QWI)							(γ_{90}) .01	.03						.610	.28	.44
Qualitative Workload (QualW)							(γ_{100}) .21	.03						.000		
Organizational Constraints (OCS)							(γ_{70}) .25	.02						.000		
Interpersonal Conflict (ICAWS)						-.07	(γ_{80}) .12	.02	.22					.000	.31	.51
Incidents at Work (INCID)							(γ_{90}) .08	.02						.000		
Move to New Hospital Site (Move)							(γ_{100}) .05	.02						.010		
Total Social Support (TSS)										-.04	-.24	.02	.23	.000	.28	.44
Decision Latitude/Control (DLC)											-.17	.02		.000		
Supervisor Support (SS)										-.05	-.19	.03	.25	.000	.23	.33
Co-worker Support (CS)											-.15	.03		.000		

* F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size.

Table 8.21: Summary of Regression Analyses Involving Main Effects for Independent Variables and Moderators in the Stressor-to-Strain Relationships for Predicting Physiological Strains

Variable	Model 1: Null			Model 2: Intermediate		Model 3: Main Effects (Independent Variables)				Model 3: Main Effects (Moderators)				p<.05	ΔR^2	F^2
	γ_{00}	SE	σ^2	γ_{00}	SE	γ_{00}	γ	SE	σ^2	γ_{00}	γ	SE	σ^2			
Outcome Variable: Physiological Strains	5.31	.12	9.90													
Intermediate Model With All Control Variables																
Constant				(γ_{00}) 5.22	.19									.000		
Age				(γ_{10}).08	.19									.672		
Gender				(γ_{20}).26	.11									.019		
Marital Status				(γ_{30}) -.02	.11									.888		
Employment Contract				(γ_{40})-.25	.10									.014		
Professional Group				(γ_{50})-.14	.11									.216		
Years Health Care				(γ_{60})-.18	.21									.374		
Years in Unit				(γ_{70}).26	.14									.067		
Level-2 Unit Size				(γ_{01}).01	.01									.293		
σ^2 for Model 2				8.63												
Main Effects																
Work Stressor Composite (WStres)						5.42	1.26	.11	7.39					.000	.12	.16
Nature of Work Composite (NOW)						6.30	.72	.05	7.80					.000	.08	.10
Psychological Demands (PsyD)							(γ_{70}) .27	.14						.061		
Physical Demands (PhysD)						5.34	(γ_{80}) .62	.11	7.19					.000	.14	.19
Quantitative Workload (QWI)							(γ_{90})- .04	.13						.769		
Qualitative Workload (QualW)							(γ_{100}).53	.0314						.001		
Organizational Constraints (OCS)							(γ_{70}) .50	.12						.000		
Interpersonal Conflict (ICAWS)						5.40	(γ_{80}) .45	.13	6.46					.001	.22	.34
Incidents at Work (INCID)							(γ_{90}) .89	.12						.000		
Move to New Hospital Site (Move)							(γ_{100}).20	.12						.102		
Total Social Support (TSS)										5.45	-.37	.12	7.57	.002	.11	.14
Decision Latitude/Control (DLC)											-.15	.15		.317		
Supervisor Support (SS)										5.36	-.09	.12	8.35	.447	.03	.04
Co-worker Support (CS)											-.42	.14		.003		

* F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size.

The next four hypotheses deal with hospital employees' physiological, psychological, and behavioural strains as mediators representing the generative mechanism (Baron & Kenny, 1986) through which work stressors, perceived by hospital employees are able to influence externally-rated unit-level performance. Mediation refers to a process through which the exogenous variable causes variation in the endogenous variable through direct, indirect, and total effects (Bollen, 1987).

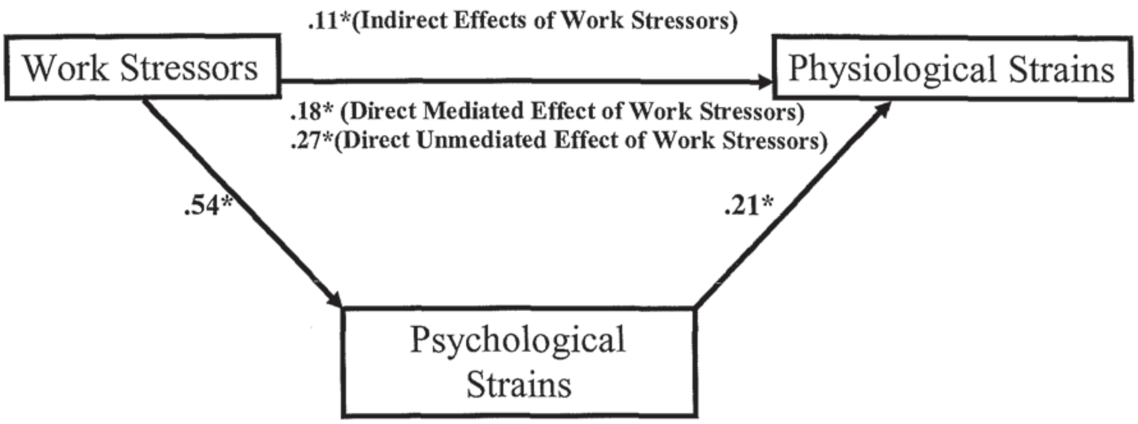
A direct effect is represented in a structural model as a single path, and refers to the influence of one variable on another. Therefore, the direct effect measures the relationship between the independent variable and the dependent variable in the absence of any mediation effects. The extent to which the direct effect changes when the mediator is added to the model determines whether or not mediation occurs. An indirect effect, on the other hand, analyses the impact of one variable on another as that variable's influence works through one or more intervening variables (Hoyle & Kenny, 1999). Specific indirect effects assess the roles of single intervening variables in a given relationship. The total effect of one variable on another is then referred to as the sum of its direct and indirect effects (Bollen, 1987).

Hypothesis 2b:

Hospital employees' work stressors are positively associated with their physiological strains through the mediating effects of their psychological strains.

Using Mplus® version 4.2, the path model is illustrated in Figure 8.6 (overleaf). There is a statistically significant indirect effect from work stressors to physiological strains via psychological strains. The standardised estimate of the direct effect between work stressors and physiological strains is reduced from 0.27 to 0.18, after controlling for psychological strains, but is still significantly different from zero. Therefore, *mediation is partial.*

Figure 8.6: Path Model of Psychological Strains as Mediator of Work Stressors' Effects on Physiological Strains



*Parameter Estimates are Standardized (*p<0.01)*

For the sake of parsimony, I removed non-significant paths from the partial mediation model to move closer to the predicted model. Indeed, from the demographic variables, *gender* was found to be significant in the path - work stressors to psychological strains, whereas *gender* and *years in health care* were found to be significant in the path - work stressors to physiological strains.

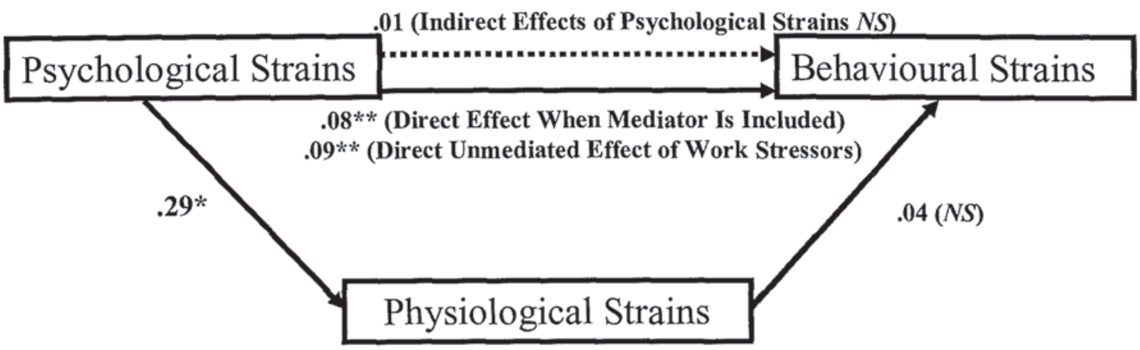
The goodness-of-fit indexes namely CFI of 0.92, TLI of 0.87, RMSR of 0.01, and RMSEA of 0.06, show acceptable fit. When testing for indirect effects, the critical ratio of 4.83 shows that the indirect effect of work stressors on physiological strains, via psychological strains, is different from zero. Therefore **hypothesis 2b** is **supported** in that work stressors are positively associated with physiological strains through the partial mediating effects of psychological strains.

Hypothesis 2c:

Hospital employees' psychological strains are positively associated with their behavioural strains through the mediating effects of their physiological strains.

Using Mplus® version 4.2, the path model, illustrated in Figure 8.7, was tested. For the sake of parsimony, I removed non-significant paths from the partial mediation model to move closer to the predicted model. From the demographic variables, *employability* was found to be significant in the path - psychological strains to physiological strains, whereas *gender* and *employability* were found to be significant in the path – psychological strains to behavioural strains. The goodness-of-fit indexes namely CFI of 0.94, TLI of 0.90, SRMR of 0.01, and RMSEA of 0.03, show acceptable fit. However, when testing for indirect effects, the critical ratio of 1.13 shows that the indirect effect of psychological strains on behavioural strains, via physiological strains, is not different from zero. The standardised estimate for the direct effect is statistically different from zero, even when controlled for mediator. The conditions for mediation are not satisfied (Baron & Kenny, 1986).

Figure 8.7
Path Model of Physiological Strains as Mediator of Psychological Strains' Effects on Behavioural Strains



*Parameter Estimates are Standardized (*p=0.01; **p=0.05) (NS=not significant)*

Therefore, **hypothesis 2c** is **not supported**, despite the fact that psychological strains are positively associated with behavioural strains, and there is good model fit, there are no mediating effects of physiological strains. These findings, which should therefore be considered as sample-specific, are not as expected and do not replicate previous research on sickness absence (Beehr, 1998; Bekker, Croon, & Bressers, 2005; Bourbonnais & Mondor, 2001).

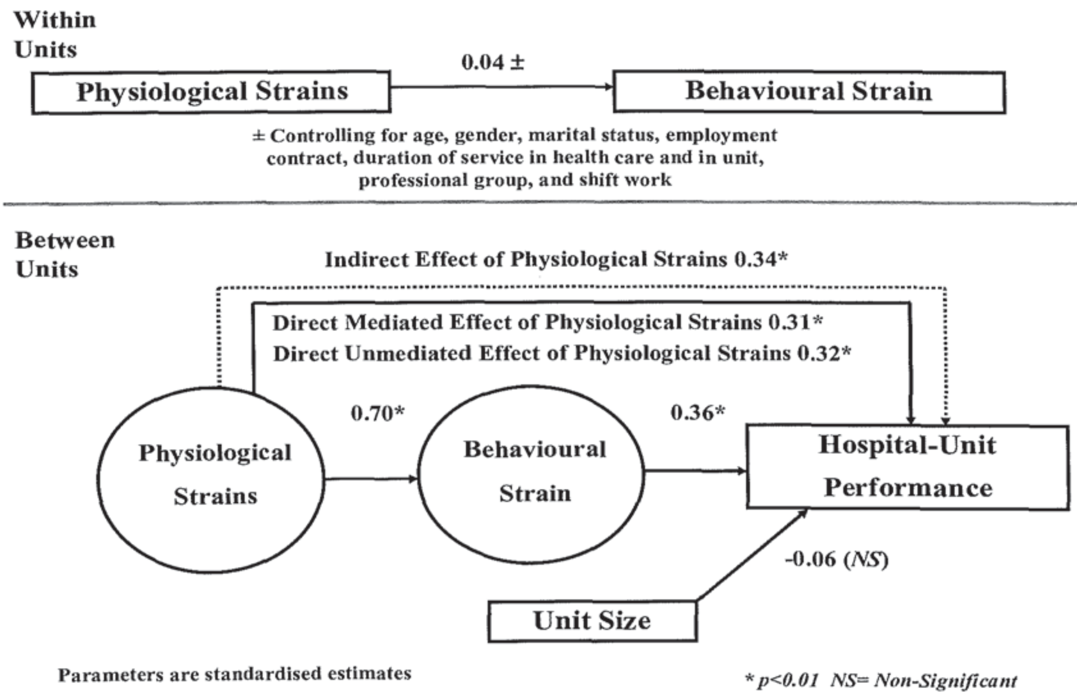
The next three hypotheses involve hospital unit performance as a higher-level outcome, and to my knowledge they have never previously been explored in the manner projected in this study. Hox (2002) and Muthén (2006) advised looking at design effect rather than intraclass correlations (ICC) to justify taking into account clustering of data. The design effect is a function of ICC and the average cluster size (approximately equal to 1 + (average cluster size – 1)* ICC). The design effects for psychological strains, physiological strains, and behavioural strains are 2.00, 1.40, and 1.3 respectively. The cut-off point of 2.0 for design effect in multilevel modelling is debatable (Muthén, 2006) so much so that multilevel modelling can be done with smaller design effects, especially when the multilevel structure itself is of interest, as is the case with these hypotheses.

Hypothesis 2d:

Hospital employees' physiological strains are positively associated with externally-rated unit-level performance through the mediating effects of the hospital employees' behavioural strains.

Figure 8.8 shows the mediating model of the hospital employees' physiological strains to externally-rated unit-level performance via the hospital employees' behavioural strains, showing a critical ratio (estimates/S.E.) of 2.11 for the indirect effect.

Figure 8.8
Path Model of Behavioural Strains as Mediator of Physiological Strains' Effects on Externally-Rated Unit-level Performance



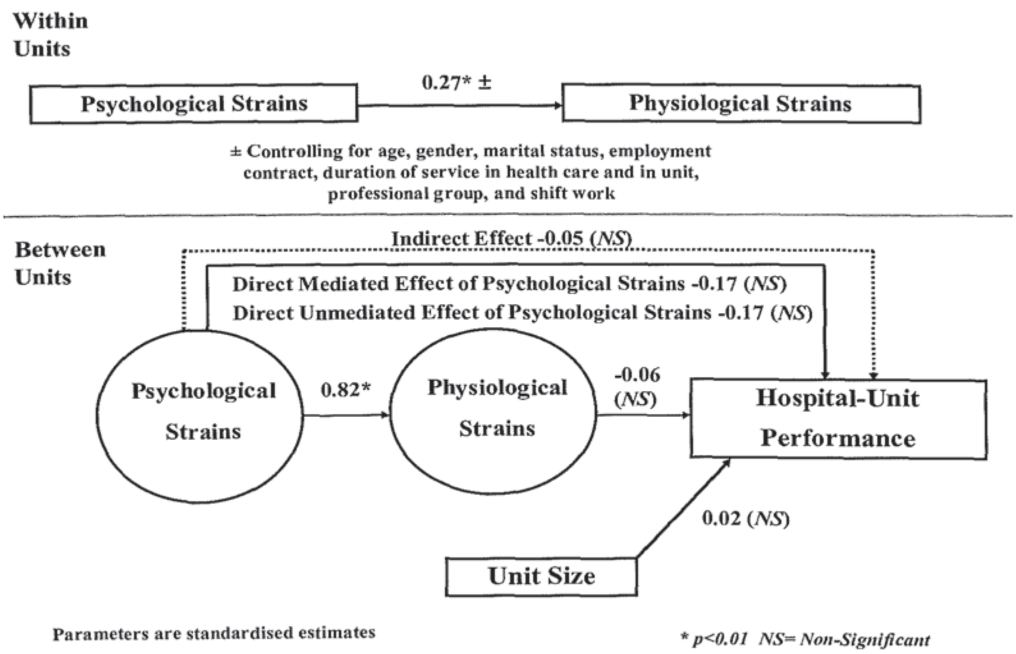
However, there is only a minimal reduction in the standardised coefficient between the direct unmediated and mediated effects. Therefore, **hypothesis 2d** is **supported** but mediation is partial. There appears to be reasonable model fit, as shown by goodness of fit statistics of RMSEA of 0.02, and SRMR of 0.002. A non-significant chi-square shows that the model fits the data well however CFI is only 0.8. The positive standardised estimates for all paths in the model suggest that the higher the total symptoms experienced, the higher the sickness absence, but also the higher the hospital performance. This may be explained by the scenario whereby hospital employees, who avail themselves from sick leave, recuperate from fatigue, replenish their resources, and may be better performing in the long run. However, the results should be considered as sample-specific. Hence, they would require validation in future research.

Hypothesis 2e:

Hospital employees' psychological strains are positively associated with externally-rated unit-level performance through the mediating effects of the hospital employees' physiological strains.

Figure 8.9 shows the mediating model of psychological strains to externally-rated unit-level performance via physiological strains, showing non-significant indirect effect. Therefore, the path model is not supported. There appears to be reasonable model fit, as shown by goodness of fit statistics of CFI of 0.9, RMSEA of 0.03, and SRMR of 0.002. A non-significant chi-square shows that the model fits the data well. Therefore, **hypothesis 2e** is **not supported as regards mediation.**

Figure 8.9
Path Model of Physiological Strains as Mediator of Psychological Strains' Effects on Externally-Rated Unit-Level Performance

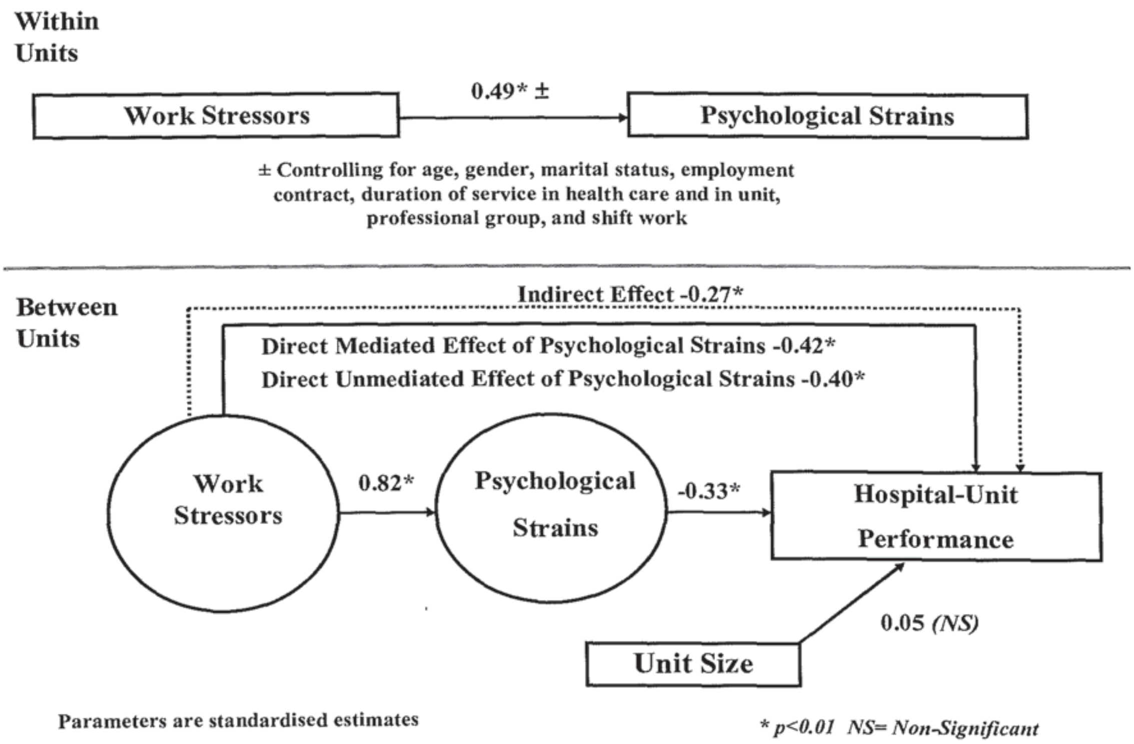


Hypothesis 2f:

Hospital employees' work stressors are positively associated with externally-rated unit-level performance through the mediating effects of hospital employees' psychological strains.

Figure 8.10 shows the mediated model of work stressors to externally-rated unit-level performance via psychological strains, showing a critical ratio (estimates/S.E.) of -3.05 for the indirect effect. There is a slight reduction between the mediated and unmediated direct effects, which are both statistically significant. There appears to be reasonable model fit, as shown by goodness of fit statistics of CFI (0.93), TLI (0.90), RMSEA (0.04), and SRMR (0.002 within-part of the model; 0.08 between part of the model). Therefore, **hypothesis 2f** is **supported**, but mediation is partial.

Figure 8.10
Path Model of Psychological Strains as Mediator of Work Stressors' Effects on Externally-Rated Unit-Level Performance

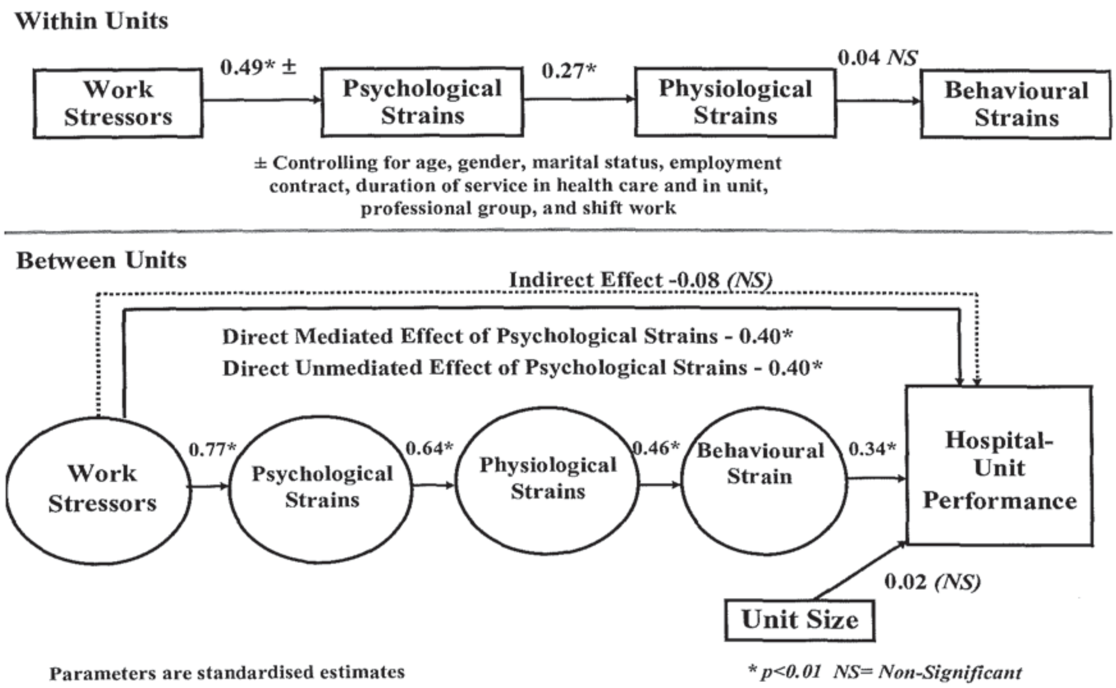


Hypothesis 2g:

Hospital employees' work stressors are positively associated with externally-rated unit-level performance through the mediating effects of hospital employees' psychological, physiological, and behavioural strains.

Figure 8.11 shows the mediating model of work stressors to externally-rated unit-level performance via psychological strains, physiological strains and behavioural strains, showing non-significant indirect effect and a significant direct effect. However, there appears to be good model fit, as shown by goodness of fit statistics of CFI of 0.92, RMSEA of 0.03, and SRMR of 0.02 for the within-part of the model. Therefore, the path model is supported.

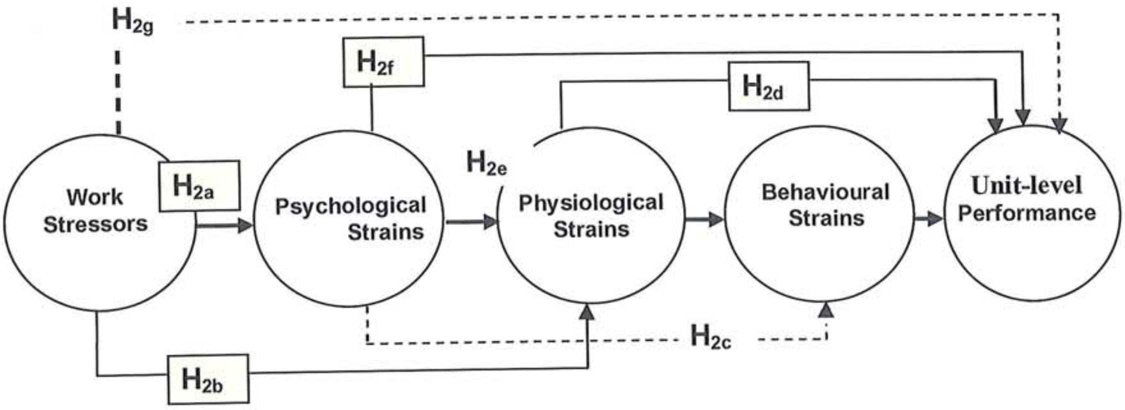
Figure 8.11: Path Model of Psychological, Physiological, and Behavioural Strains as Mediators of Work Stressors' Effects on Externally-Rated Unit-Level Performance



Therefore, **hypothesis 2g** is **not supported as regards mediation**, but there appears to be direct significant relationships between the variables in the path model.

In Summary, hypothesis testing of the second group of hypotheses revealed that, some but not all the paths are statistically significant, as illustrated in Figure 8.12. The results, however, show that there are clear mediational effects in the path diagram from hospital employees' work stressors to externally-rated unit-level performance. The paths that were found to be statistically significant include: the main effects of work stressors-to-psychological strains and of work stressors-to-physiological strains; the partial mediation of psychological strains in the relationship between work stressors and physiological strains; the partial mediation of behavioural strains in the relationship between physiological strains and externally-rated unit-level performance; and the partial mediation of psychological strains in the relationship between work stressors and externally-rated unit-level performance.

Figure 8.12
Statistically Significant Relationships in Hypotheses Group Two
(The non-significant relationships are marked as dashed lines; Blue-coloured hypotheses are rejected)



Study two is however cross-sectional in design, and therefore, does not allow me to draw any conclusions in terms of the direction of causality. Indeed, longitudinal data concerning the variables under study are intended to further clarify these relationships in future research.

8.3.3 Hypotheses Group Three: Social Support and Decision Latitude/Control as Moderators of the Work Stressor-to-Strain Relationships. Higher Levels of Social Support/Decision Latitude (Control) Will Minimise (*Buffer*) these Relationships.

As discussed in chapter seven, the variables in the hypothesised moderated stressor-strain relationships are intended at the unit member level. The indices of within-group agreement ($r_{wg(j)}$ values being above the 0.7) as well as intraclass correlations (*F*-ratios of *ICC(1)* are statistically significant; most *ICC(2)* values are above 0.5) suggest that there is violation of the assumption of independence of observations due to influence from unit membership.

Hence, traditional moderated regressions, as was carried out in study one that would have ignored the effects of unit membership, would be misspecified. Therefore, it was decided that multilevel modelling techniques, namely by means of HLM, are more appropriate to analyse these relationships. Indeed, to my knowledge, only Bliese and colleagues (2001) have published multilevel techniques in occupational stress research and within the US military context. Therefore, this study has adopted an innovative and statistically more accurate approach at analysing moderated relationships of work stressors-to-strains relationships.

In Hierarchical Linear Modelling, the coefficients in the models are estimated using restricted maximum likelihood estimation algorithm. Traditional regression models using ordinary least squares estimation would have ignored the effects of individual hospital units, and therefore, would have been misspecified. The significant variation among level-2 units that also included the level-2 error terms avoided overestimating the effects of the level-2 independent variables, namely transformational leadership and team climate.

As described earlier, HLM analysis involves several steps (Raudenbush & Bryk, 2002). **First**, the **unconditional models** determine whether there is sufficient variability in the outcome measures across units. In this group of hypothesis, the outcome variables include the unit member psychological and physiological strains. The unconditional model has the form:

Individual-level: Outcome Variable (psychological/physiological strains) $= \beta_{0j} + r_{ij}$ (8.1)

Unit-level $\beta_{0j} = \gamma_{00} + u_{0j}$ (8.2)

Table 8.23 (next page) shows the output from the unconditional hierarchical models for the outcome variables. The variance components (τ_{00}) of the unit-level model residuals (u_{0j}) indicate that there is statistical evidence of between-unit variability for the outcome variables above to justify continuation of the hierarchical model building process.

The **intraclass correlation coefficients** *ICC* (ρ) for **the unconditional models**, based on equation 8.3 are the following: *ICC* for job satisfaction is 0.14, which indicates that approximately 14 % of the total variance in scores of job satisfaction is explained by unit membership. *ICC* for intention to leave job is 0.11(11% of variance of intention to leave job is explained by unit membership). *ICC* for emotional exhaustion is 0.12; for depersonalisation: 0.08; personal accomplishment: 0.09; and burnout composite score: 0.14. *ICC* for psychological strains composite score is 0.15, whereas for physiological strains, it is 0.04.

In summary, the unconditional models demonstrate that substantial percentage of statistically significant variance of the strains resides between groups, thereby providing the basis for adopting a multilevel approach in analysing moderation of the stressor-to-strain relationships.

Table 8.22: Unconditional Hierarchical Models for Psychological and Physiological Strains

Outcome Variable	*FIXED EFFECT*	*Coefficient*	*SE*	*t-ratio/df*	*p-value*
Composite Psychological Strains	**PsyS Mean (γ_{00})**	**-0.01**	**0.03**	**-0.32/135**	**0.750**
Job Satisfaction	**JSat Mean (γ_{00})**	**3.27**	**0.04**	**94.85/135**	**0.000**
Intention to Leave Job	**Intlve Mean(γ_{00})**	**2.63**	**0.06**	**48.21/135**	**0.000**
Emotional Exhaustion	**EE Mean (γ_{00})**	**3.07**	**0.05**	**68.35/135**	**0.000**
Depersonalization	**DP Mean (γ_{00})**	**0.31**	**0.01**	**46.40/135**	**0.000**
Personal Accomplishment	**PA Mean (γ_{00})**	**3.68**	**0.03**	**126.88/135**	**0.000**
Burnout Composite	**BO Mean (γ_{00})**	**6.33**	**0.07**	**87.91/135**	**0.000**
Physiological Strains	**PhyS Mean (γ_{00})**	**5.31**	**0.12**	**43.11/135**	**0.000**

Outcome Variable	*RANDOM EFFECT*	*SD*	*Variance Component* (τ_{00})	*Chi-Square/df*	*p-value*
Composite Psychological Strains	**PsyS Mean (u_{0j})**	**0.25**	**0.07**	**296.48/135**	**0.000**
Job Satisfaction	**JSat Mean (u_{0j})**	**0.27**	**0.07**	**277.72/135**	**0.000**
Intention to Leave Job	**Intlve Mean(u_{0j})**	**0.40**	**0.16**	**242.25/135**	**0.000**
Emotional Exhaustion	**EE Mean (u_{0j})**	**0.36**	**0.13**	**276.53/135**	**0.000**
Depersonalization	**DP Mean (u_{0j})**	**0.04**	**0.00**	**214.12/135**	**0.000**
Personal Accomplishment	**PA Mean (u_{0j})**	**0.20**	**0.04**	**219.50/135**	**0.000**
Burnout Composite	**BO Mean (u_{0j})**	**0.57**	**0.32**	**275.88/135**	**0.000**
Physiological Strains	**PhyS Mean (u_{0j})**	**0.64**	**0.42**	**183.83/135**	**0.004**

In testing hypotheses group 3, I will first look at the macro prior to probing the micro picture. I will thus enter the composite scores into the moderated regression equations. However, I will also be testing for two-way and three-way interactions involving single dimensions. As discussed in chapter seven, by using level-one equation in HLM, and utilising the format of moderated regression analysis of OLS, the variables were entered into the regression as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(AGE) + \beta_{2j}(SEX)+ \beta_{3j}(MAR) + \beta_{4j}(EMP) + \beta_{5j}(PROFG) + \beta_{6j}(YRSH) + \beta_{7j}(YRSU) + \beta_{8j}(WORK\ STRESSOR) + \beta_{9j}(SOCIAL\ SUPPORT) + \beta_{10j}(WORK\ STRESSOR\ COMPOSITE*SOCIAL\ SUPPORT) + r_{ij} \quad (8.3)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\ (UNSIZE)_j + u_{0j} \quad (8.4)$$

As discussed earlier, the product term should be significant in the regression equation in order for the interaction to be interpretable, and prior to plotting the interaction effects. Psychological well-being could not used as a marker variable to overcome common source bias in these relationships, due to its proximity with physiological and psychological strains, unlike the relationships in the first group of hypotheses.

8.3.3.1 Psychological Strains as Dependent Variable

Table 8.23 shows a summary of regression analyses including only the statistically significant ($p<0.05$) two-way and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which vary from medium to large effects.

The results show various statistically significant two-way interactions namely, total social support with psychological demands and with interpersonal conflict at work; supervisor support with composite work stressors, with interpersonal conflict, and with incidents at work; and co-worker support with psychological demands, with physical demands and with interpersonal conflict at work. These results are as expected and confirm the robust theoretical and empirical work related to the buffering hypotheses of stress by eminent scholars like Karasek, Maslach, Bliese, Schaufeli and colleagues, as detailed in chapter two.

Additionally, there is only one statistically significant two-way interaction involving decision latitude/control as a moderator with interpersonal conflict at work as illustrated in Figure 8.13. This shows a buffering effect of decision latitude/control so much so that in the presence of high levels of decision latitude/control, there is no relation between interpersonal conflict at work and psychological strains. In contrast, in the presence of low decision latitude/control, there is a positive association between interpersonal conflict and psychological strains.

Table 8.23: Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Psychological Strains,

(Only statistically-significant two-way and three-way interactions are listed)

Variable		Model 1: Null			Model 2: Control Variables		Model 3: 2-Way				Model 4: 3-Way				$p<.05$	ΔR^2	$\pm F^2$
		γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome: Psychological Strains		-.01	.03	.36													
Model 2: Intermediate Model With All Control Variables																	
Constant					(γ_{00}) -.04	.04									.358		
Age					(γ_{10}) -.05	.03									.076		
Gender					(γ_{20}) -.07	.02									.003		
Marital Status					(γ_{30}) .02	.02									.292		
Employment Contract					(γ_{40}) -.04	.02									.045		
Professional Group					(γ_{50}) -.05	.03									.089		
Years Health Care					(γ_{60}) -.06	.03									.066		
Years in Unit					(γ_{70}) -.01	.02									.832		
Level-2 Unit Size					(γ_{01}) .00	.00									.171		
σ^2 for Model 2					.33												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																	
WStres x SS	WORK STRESS COMPOSITE x SUPERVISOR SUPPORT						-.02	.04	.02	.20					**.029**	**.36**	**.69**
PsyD x TSS	PSYCHOLOGICAL DEMANDS x TOTAL SOCIAL SUPPORT						.01	.04	.02	.22					**.020**	**.33**	**.60**
PsyD x CS	PSYCHOLOGICAL DEMANDS x CO-WORKER SUPPORT						-.02	.03	.01	.22					**.028**	**.33**	**.60**
PhysD x CS	PHYSICAL DEMANDS x CO-WORKER SUPPORT						-.03	.04	.02	.26					**.050**	**.24**	**.38**
ICAWS x TSS	INTERPERSONAL CONFLICT x TOTAL SOCIAL SUPPORT						-.05	.05	.02	.23					**.008**	**.29**	**.49**
ICAWS x SS	INTERPERSONAL CONFLICT x SUPERVISOR SUPPORT						-.04	.05	.02	.22					**.015**	**.33**	**.60**
ICAWS x CS	INTERPERSONAL CONFLICT x CO-WORKER SUPPORT						-.07	.05	.02	.25					**.013**	**.19**	**.28**
ICAWS x DLC	INTERPERSONAL CONFLICT x DECISION LATITUDE/CONTROL						-.08	-.05	.02	.23					**.016**	**.29**	**.49**
INCID x SS	INCIDENTS AT WORK x SUPERVISOR SUPPORT						-.01	.04	.02	.24					**.050**	**.26**	**.42**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																	
WStres xSSx DLC	WORK STRESS COMPOSITE x SUPERVISOR SUPPORT x DECISION LATITUDE/CONTROL										-.01	-.03	.02	.14	**.043**	**.16**	**.45**
NOW xTSSxDLC	NATURE OF WORK x TOTAL SOCIAL SUPPORT x DECISION LATITUDE/CONTROL										-.03	-.03	.01	.16	**.036**	**.19**	**.53**
NOWxSSxDLC	NATURE OF WORK x SUPERVISOR SUPPORT x DECISION LATITUDE/CONTROL										-.02	-.03	.02	.17	**.027**	**.12**	**.30**
PhysDxTSSxDLC	PHYSICAL DEMANDS x TOTAL SOCIAL SUPPORT x DECISION LATITUDE/CONTROL										-.01	-.05	.01	.19	**.001**	**.12**	**.23**
PhysDxSSxDLC	PHYSICAL DEMANDS x SUPERVISOR SUPPORT x DECISION LATITUDE/CONTROL										-.02	-.04	.01	.19	**.001**	**.14**	**.28**
QWxTSSxDLC	QUANTITATIVE WORKLOAD x TOTAL SOCIAL SUPPORT x DECISION LATITUDE/CONTROL										-.03	.03	.01	.18	**.050**	**.11**	**.23**
QualWxCSxDLC	QUALITATIVE WORKLOAD x CO-WORKER SUPPORT x DECISION LATITUDE/CONTROL										-.07	-.06	.02	.17	**.009**	**.19**	**.42**
OCSxTSSxDLC	ORGANISATIONAL CONSTRAINTS x TOTAL SOCIAL SUPPORT x DECISION LATITUDE/CONTROL										-.06	-.03	.01	.16	**.012**	**.12**	**.28**
MovexSSxDLC	MOVE TO NEW HOSPITAL x SUPERVISOR SUPPORT x DECISION LATITUDE/CONTROL										-.03	-.05	.02	.18	**.014**	**.15**	**.29**

$\pm F^2$ (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

Figure 8.13
Moderating Effect of Decision Latitude/Control on Psychological Strains with Interpersonal Conflict at Work

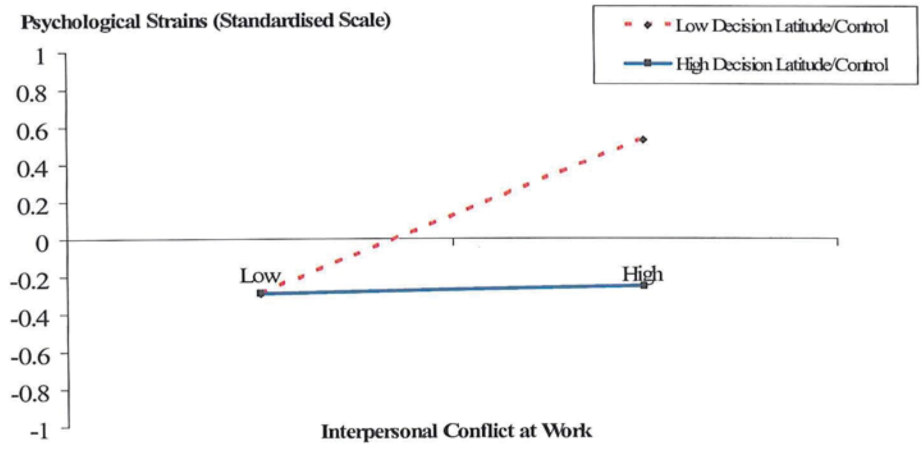
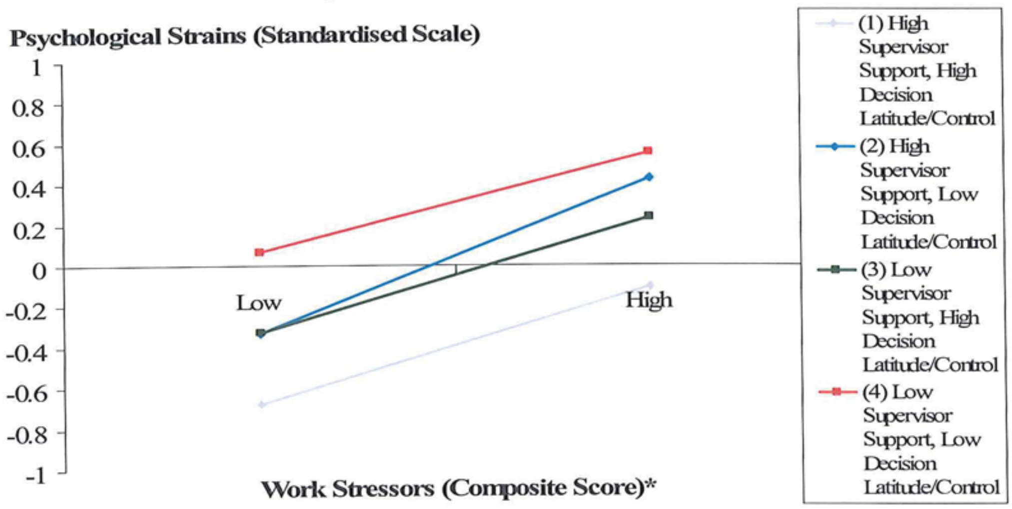


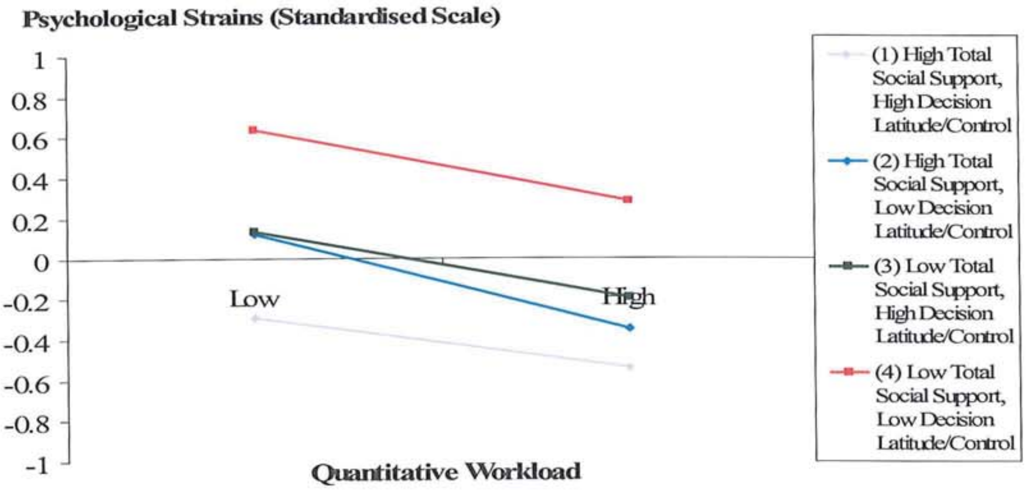
Table 8.23 also includes a number of statistically significant three-way interactions, namely that when levels of decision latitude/control are high, higher levels of social support will 'buffer' the negative relationships between work stressors and psychological strains. On the other hand, when decision latitude/control is low, the buffering effects of social support will be minimised. Some but not all the three-way interactions tested were found to be statistically significant. For example, Figure 8.14 shows that psychological strains were highest when respondents reported high work stressors, low supervisor support and low decision latitude/control.

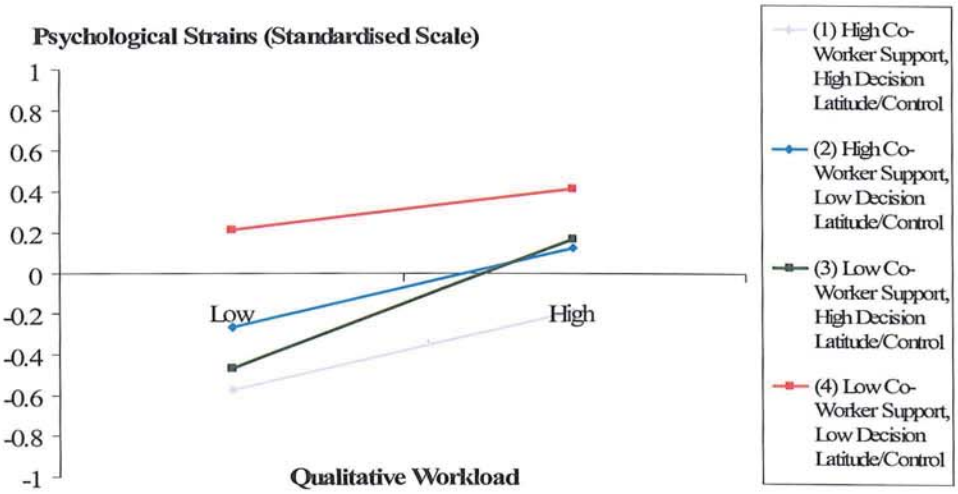
Figure 8.14: Three-Way Interaction: Work Stressors Composite Score x Supervisor Support x Decision Latitude/Control with Psychological Strains as Dependent Variable



This is in line with the iso-strain hypothesis of the DC/S model. Conversely, psychological strains were lowest when respondents reported low work stressors, high supervisor support and high decision latitude/control. The graph shows that for all the combinations in the levels of supervisor support and decision latitude/control, there is a positive association between work stressors and psychological strains. There is also evidence of an interaction effect involving the two mixed combinations of levels of moderator variables, with decision latitude/control having a greater impact than supervisor support at lowering psychological strains when work stressors are high. Figure 8.15 (A) shows that psychological strains were highest when respondents reported low quantitative workload, low supervisor support and low decision latitude/control. Psychological strains were lowest when respondents reported high quantitative workload, high supervisor support and high decision latitude/control. Figure 8.15 (B) shows that psychological strains were highest when respondents reported high qualitative workload, low supervisor support and low decision latitude/control.

Figure 8.15
Three-Way Interactions: A. Quantitative Workload x Total Social Support x Decision Latitude/Control; and B. Qualitative Workload x Co-Worker Support x Decision Latitude/Control with Psychological Strains as Dependent Variable



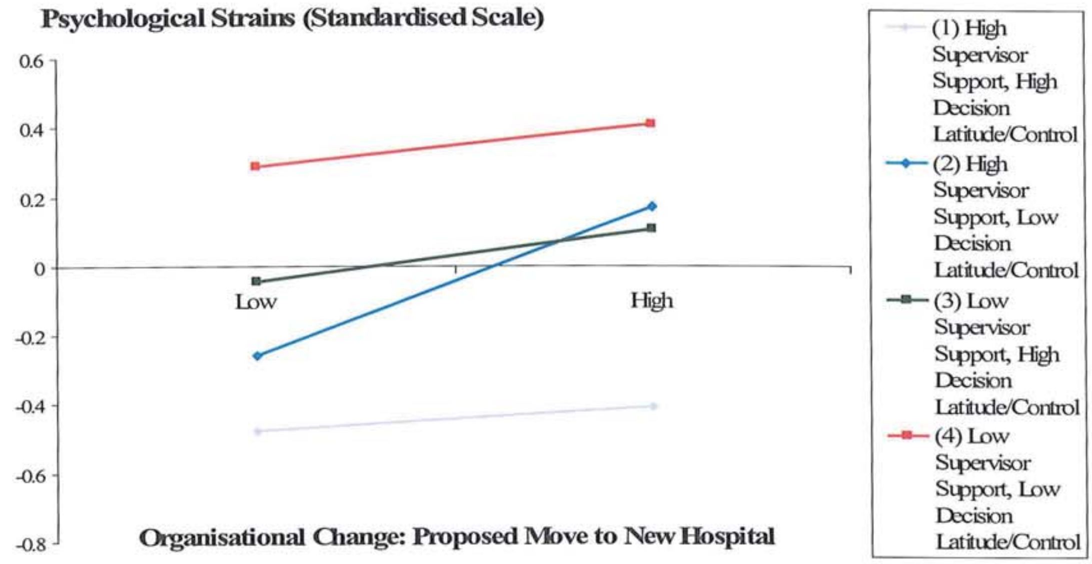


Psychological strains were lowest when respondents reported low qualitative workload, high supervisor support and high decision latitude/control. Graph 8.17(A) shows that for all the combinations in the levels of total social support and decision latitude/control, there is a negative association between quantitative workload and psychological strains. The direction of this association is not as hypothesized and indeed, contrasts the direction of all other work stressors-strains relationships tested in this study. For example, the graph for quantitative workload (A) contrasts that for qualitative workload (B), with the result that the linear relationships are mirror images of each other. A possible explanation to this is that higher activity units drive employees to higher levels of motivation, a factor which in turn leads to active mastery (Karasek & Theorell, 1990), thereby protecting employees from stress.

Graphs 8.15 (A) and 8.15 (B) show nearly parallel linear relationships between the two outer lines involving the higher and the lower levels of the two moderator variables respectively, suggestive of main effects with the higher combined levels of moderators resulting in lower levels of psychological strains across all levels of quantitative and qualitative workload. There is an interaction between the middle two linear relationships such that in (A) when quantitative workload is high, high total social support lowers psychological strains more than high level of decision latitude/control. In (B) when qualitative workload is low, high decision latitude/control lowers psychological strain more than high level of co-worker support.

Figure 8.16 shows that psychological strains were highest when respondents reported high stress due to proposed move to new hospital, low supervisor support and low decision latitude/control. Psychological strains were lowest when respondents reported low stress from proposed move, high supervisor support and high decision latitude/control. Figure 8.18 similarly shows the almost parallel outer linear relationships representing the combined higher and lower levels of moderator variables. In the presence of higher levels of moderator variables, psychological strains are lowest across all levels of stress secondary to the major organisational change.

Figure 8.16
Three-Way Interaction: Organisational change x Supervisor Support x Decision Latitude/Control with Psychological Strains as Dependent Variable



The middle two linear relationships demonstrate the interaction effect of supervisor support and decision latitude/control with the stressor. At low levels of the stressor, high supervisor support lowers psychological strains more than higher levels of decision latitude/control. The two linear relationships cross over, and as a result, the reverse occurs at the higher level of the work stressor. However, there is a greater difference between the two linear relationships at the lower than at the higher level of the work stressor.

In summary, the buffering hypothesis with *psychological strain (composite)* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.24. Interestingly enough, and not in accordance with the direction of the hypothesised relationship, the results show that the higher the levels of quantitative workload, the lower the levels of psychological strain. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. Since, I have found limited support for the relationships that carry solely the composite scores; I have also tested meaningful relationships that include the first order constructs.

8.3.3.2 Physiological Strains as Dependent Variable

Table 8.24 (overleaf) shows a summary of regression analyses including only the statistically significant two-way and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which vary from small/medium/large effects.

The significant two-way interactions include total social support with psychological demands, quantitative workload, interpersonal conflict at work, and organisational change; supervisor support with interpersonal conflict at work, and organisational change; and co-worker support with nature of work, psychological demands, and quantitative workload. In contrast, there are no significant two-way interactions involving decision latitude/control as moderator and physiological strains as dependent variable.

Table 8.24 also shows several significant three-way interactions with medium/large effect sizes, namely, physical demands x supervisor support x decision latitude/control; nature of work x supervisor support x decision latitude/control; nature of work x co-worker support x decision latitude/control; psychological work demands x total social support x decision latitude/control; and psychological work demands x co-worker support x decision latitude/control.

Figures 8.17, and 8.18, 8.19, 8.20 and 8.21 (next pages) are graphical representations of the two-way interactions involving physiological strains as dependent variable.

Figure 8.17
Moderating Effect of Co-Worker Support on Physiological Strains with Nature of Work

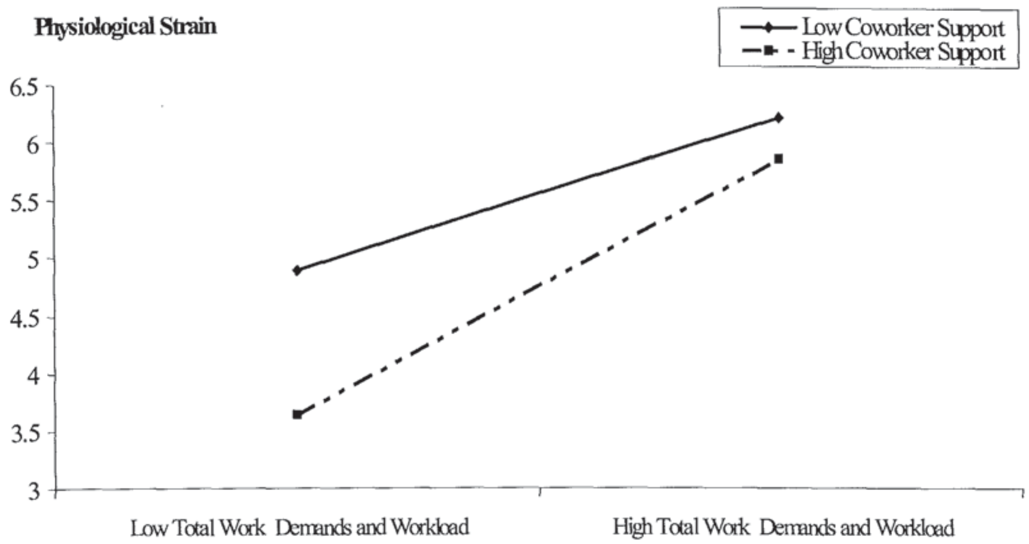


Figure 8.19 presents a pattern whereby nature of work, which is characterised by both work demands and workload, is associated with physiological strains with those having higher co-worker support registering significantly less physiological strains.

Table 8.24: Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Physiological Strains *(Only statistically-significant two-way and three-way interactions are listed)*

Variable		Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	$\pm F^2$
		γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome: Physiological Strains Y_{ij}		5.31	.12	10.11											.000		
Model 2: Intermediate Model With All Control Variables																	
Constant					(γ_{00}) 5.22	.19									.000		
Age					(γ_{10}).08	.19									.672		
Gender					(γ_{20}).26	.11									.019		
Marital Status					(γ_{30}) -.02	.11									.888		
Employment Contract					(γ_{40})-.25	.10									.014		
Professional Group					(γ_{50})-.14	.11									.216		
Years Health Care					(γ_{60})-.18	.21									.374		
Years in Unit					(γ_{70}).26	.14									.067		
Level-2 Unit Size(w_j)					(γ_{01}).01	.01									.293		
σ^2 for Model 2					8.63												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																	
NOW x CS	**Nature of Work x Co-Worker Support**						5.16	.23	.07	7.67					**.003**	**.09**	**.12**
PsyD x TSS	**Psychological Work Demands x Total Social Support**						5.14	.21	.09	7.93					**.021**	**.05**	**.06**
PysD x CS	**Psychological Work Demands x Co-Worker Support**						5.07	.29	.09	7.78					**.003**	**.10**	**.13**
QWI xTSS	**Quantitative Workload x Total Social Support**						5.16	-.17	.08	8.39					**.027**	**.03**	**.04**
QWI x CS	**Quantitative Workload x Co-Worker Support**						5.10	-.25	.08	8.34					**.002**	**.04**	**.06**
ICAWS x TSS	**Interpersonal Conflict at Work x Total Social Support**						5.33	.25	.11	7.73					**.033**	**.08**	**.10**
ICAWS x SS	**Interpersonal Conflict at Work x Supervisor Support**						5.32	.23	.09	7.84					**.013**	**.06**	**.07**
Move x TSS	**Organisational Change x Total Social Support**						5.50	.25	.12	7.34					**.033**	**.06**	**.07**
Move x SS	**Organisational Change x Supervisor Support**						5.50	.23	.11	7.50					**.041**	**.05**	**.06**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																	
NOWxSSxDLC	**Nature of Work x Supervisor Support x Decision Latitude/Control**										**5.51**	**-.22**	**.08**	**6.16**	**.007**	**.39**	**1.18**
NOWxCSxDLC	**Nature of Work x Co-Worker Support x Decision Latitude/Control**										**5.42**	**-.14**	**.07**	**6.12**	**.059**	**.10**	**.15**
PsyDxTSSxDLC	**Psychological Work Demands x Total Social Support x Decision Latitude/Control**										**5.41**	**-.21**	**.09**	**6.12**	**.020**	**.16**	**.24**
PsyDxCSxDLC	**Psychological Work Demands x Co-Worker Support x Decision Latitude/Control**										**5.39**	**-.22**	**.10**	**6.12**	**.031**	**.09**	**.13**
PhysDxSSxDLC	**Physical Demands x Supervisor Support x Decision Latitude/Control**										**5.50**	**-.20**	**.06**	**6.96**	**.001**	**.07**	**.10**

$\pm F^2$ (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

The buffering effect is highest with low levels of nature of work. The graphs in Figures 8.18 and 8.19 show similar patterns, as that in Figure 8.17. There is the interesting finding (similar to that for psychological strains in Figure 8.15) that those having higher levels of quantitative workload have lower levels of physiological strains. Figures 8.20 and 8.21 show two-way interaction effects, so much so that social support, mostly provided by supervisors, moderates the relationships of interpersonal conflict and organisational change with physiological strains, mostly at the lower levels of the work stressors. Indeed, at the higher levels of the work stressors, the moderator variables have no influence on lowering the strains.

Figure 8.18: Moderating Effects of A. Total Social Support and B. Co-Worker Support on Physiological Strains with Psychological Demands

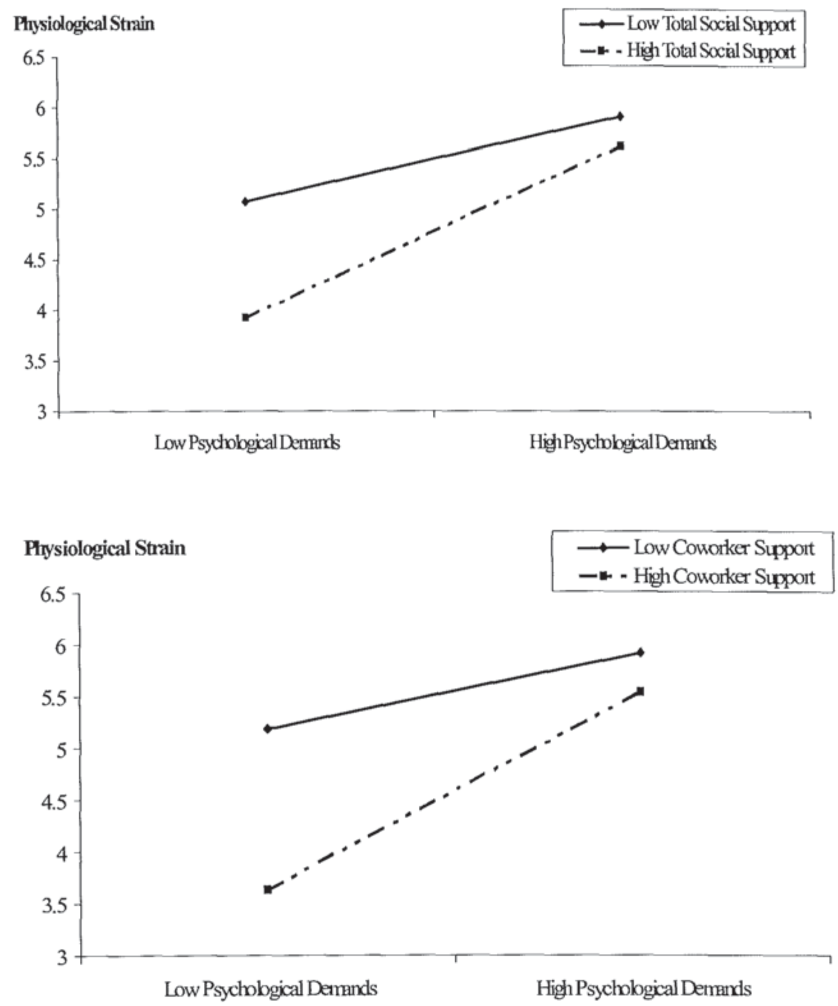


Figure 8.19: Moderating Effects of A. Total Social Support and B. Co-Worker Support on Physiological Strains with Quantitative Workload

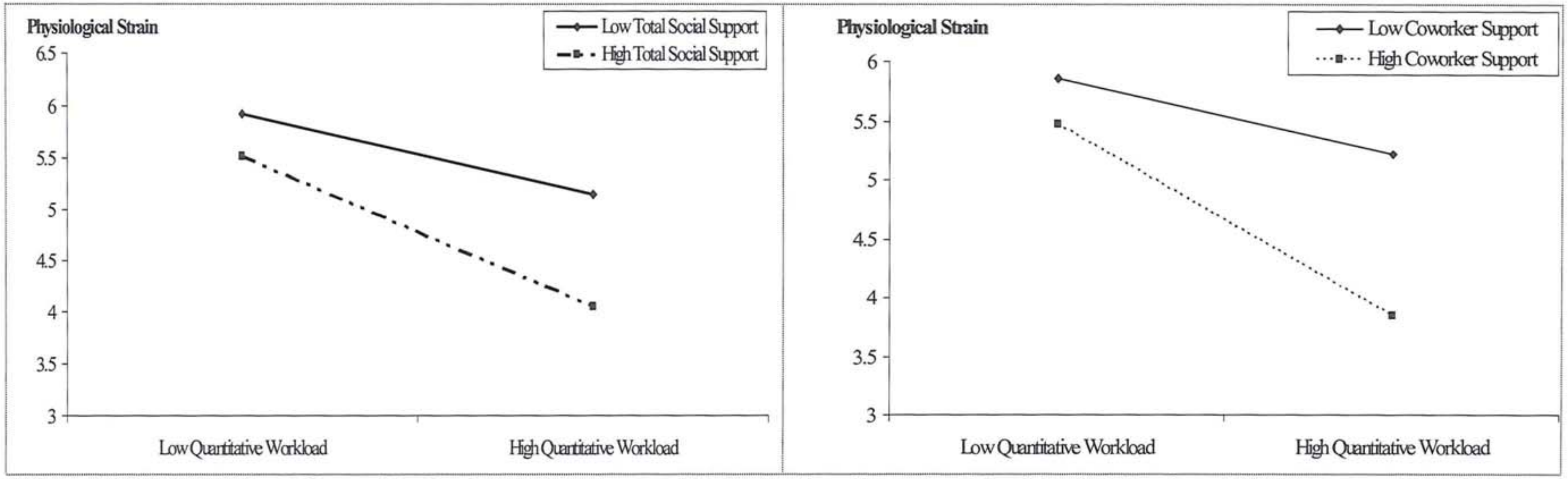


Figure 8.20: Moderating Effects of A. Total Social Support and B. Supervisor Support on Physiological Strains with Interpersonal Conflict

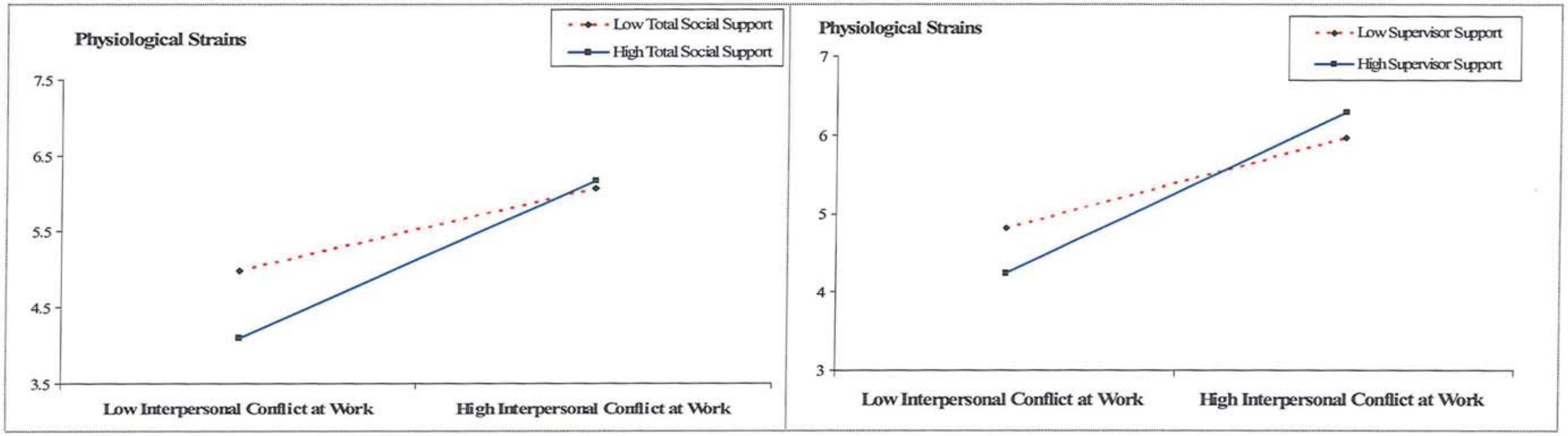


Figure 8.21: Moderating Effects of A. Total Social Support and B. Supervisor Support on Physiological Strains with Organisational Change

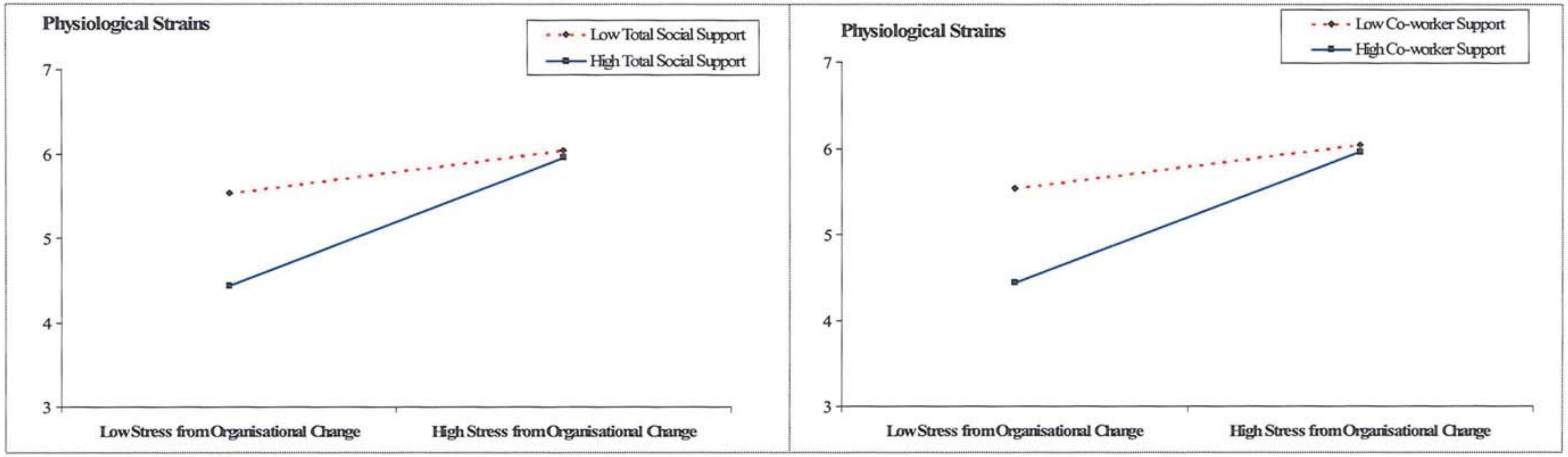
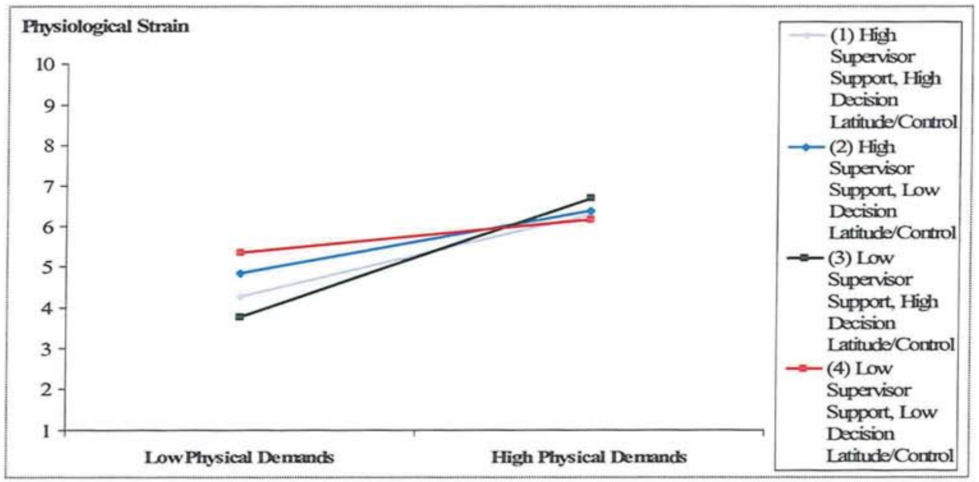


Figure 8.22: Three-Way Interactions: Physical Demands x Supervisor Support x Decision Latitude/Control with Physiological Strains as Dependent Variable



Figures 8.22, and 8.23, 8.24 (overleaf) illustrate the significant three-way interactions. Figure 8.24, shows that for all combinations in the levels of moderator variables, there is a positive association between physical demands and physiological strains. However, this association is weakest in the presence of low levels of supervisor support and decision latitude/control. The difference between the linear relationships is greater at the lower than at the higher levels of the work stressor, such that at the higher levels of physical demands, there is no effect by the moderators at lowering the strains.

Figure 8.22 shows that physiological strains were highest when unit members reported high physical demands, low supervisor support and high decision latitude/control. Physiological strains were lowest when respondents reported low physical demands, low supervisor support and high decision latitude/control. Therefore, decision latitude/control appears to buffer respondents against physiological strains *only* when physical demands are low.

Figures 8.23 and 8.24 show very similar patterns, in that social support, which is mostly in the form of supervisor and co-worker support, interacts with decision latitude/control and the specific work stressor. Figure 8.24 shows that in the presence of lower levels of the moderator variables, there is a no or minimal positive association between psychological demands and physiological strains. However, for all the other combinations in the levels of the moderator variables, there are strong positive associations, with the higher levels of the moderator variables resulting into lower levels of physiological strains. Additionally, high decision latitude/control appears to lower physiological strains at the lower levels of the stressor, whereas high social support, mainly by co-workers is the one that lowers the strains at the higher level of the stressor.

Figure 8.23 Three-Way Interactions: A. Nature of Work x Supervisor Support x Decision Latitude/Control; and B. Nature of Work x Co-worker Support x Decision Latitude/Control with Physiological Strains as Dependent Variable

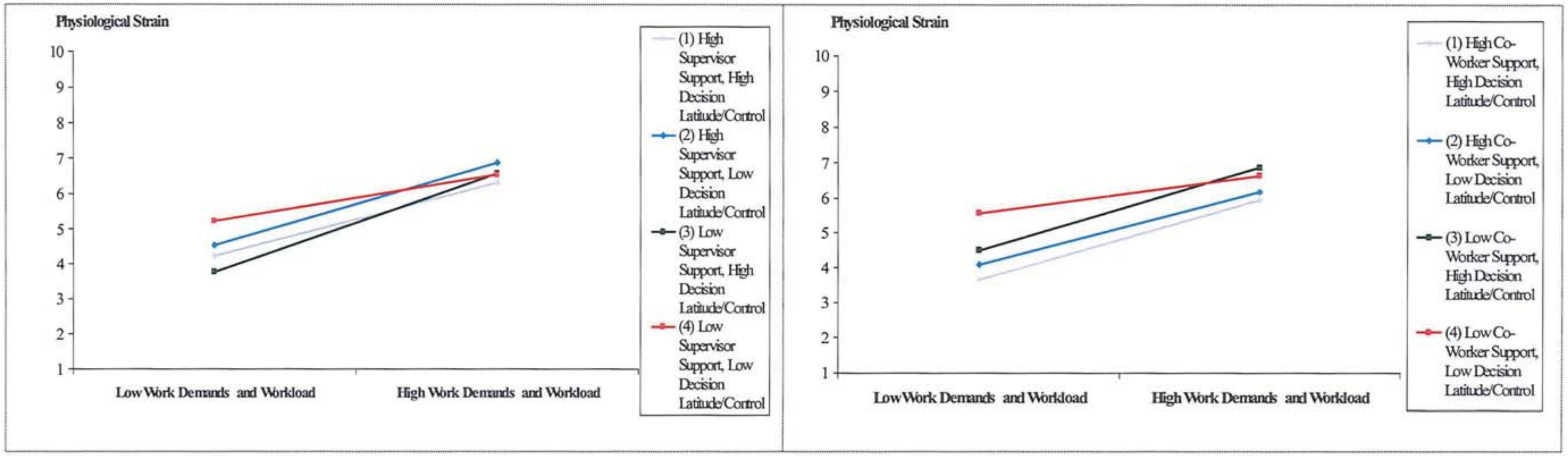
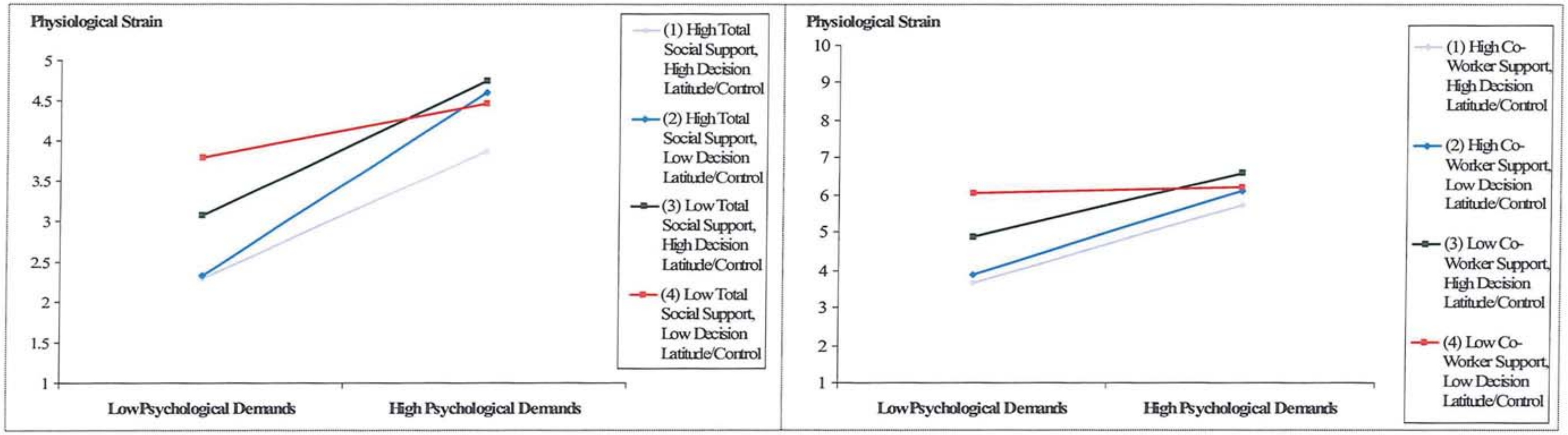


Figure 8.24: Three-Way Interactions: A. Psychological Demands x Total Social Support x Decision Latitude/Control; and B. Psychological Demands x Co-worker Support x Decision Latitude/Control with Physiological Strains as Dependent Variable



In summary, the buffering hypothesis with *physiological strain* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.24. Consistently, the results show that the higher the levels of quantitative workload, the lower the levels of physiological strain. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators.

8.3.3.3 Job Satisfaction as Dependent Variable

Table 8.25 shows a summary of regression analyses including only the statistically significant two-way and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which are nearly all large. The results show various significant two-way interactions namely total social support with psychological demands; and co-worker support with composite work stressors, physical demands, and quantitative workload. There is also a significant two-way interaction involving decision latitude/control and interpersonal conflict at work. Figure 8.25 shows the buffering effect of co-worker support. In general, job satisfaction goes down the higher the work stressors, with a slightly steeper slope for those with high co-worker support.

Figure 8.25: Moderating Effect of Co-Worker Support on Job Satisfaction with Work Stressors

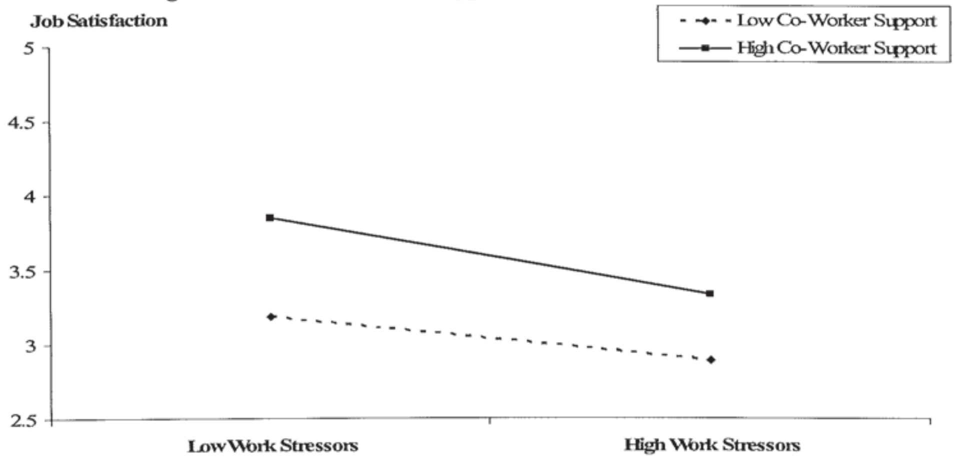


Table 8.25 Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Job Satisfaction
(Only statistically-significant two-way and three-way interactions are listed)

Variable	Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	$\pm F^2$
	γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable Y_{ij}																
Job Satisfaction	3.27	.04	.46											.000		
Model 2: Intermediate Model With All Control Variables																
Constant				(γ_{00}) 3.33	.05									.000		
Age				(γ_{10}) .05	.04									.216		
Gender				(γ_{20}) .06	.03									.046		
Marital Status				(γ_{30}) -.02	.03									.406		
Employment Contract				(γ_{40}) .01	.02									.530		
Professional Group				(γ_{50}) .06	.03									.050		
Years Health Care				(γ_{60}) -.02	.04									.609		
Years in Unit				(γ_{70}) .02	.03									.487		
Level-2 Unit Size (w_j)				(γ_{01}) -.00	.00									.006		
σ^2 for Model 2				.41												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																
WStres x CS (γ_{x0})	**Work Stressors Composite x Co-Worker Support**					3.31	-.05	.03	.31					**.049**	**.21**	**.34**
PsyD x TSS (γ_{x0})	**Psychological Demands x Total Social Support**					3.26	-.04	.02	.26					**.020**	**.32**	**.63**
PhysD x CS (γ_{x0})	**Physical Demands x Co-Worker Support**					3.29	-.05	.03	.34					**.044**	**.13**	**.19**
QWI xCS (γ_{x0})	**Quantitative Workload x Co-Worker Support**					3.31	.05	.03	.33					**.037**	**.17**	**.26**
ICAWS x DLC(γ_{x0})	**Interpersonal Conflict x Decision Latitude/Control**					3.33	.07	.03	.28					**.012**	**.19**	**.30**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																
WStres x SS x DLC (γ_{x0})	**Work Stressors Composite x Supervisor Support x Decision Latitude/Control**									3.22	.04	.02	.17	**.026**	**.17**	**.39**
NOW x TSS x DLC (γ_{x0})	**Nature of work x Total Social Support x Decision Latitude/Control**									3.24	.04	.02	.19	**.053**	**.15**	**.40**
QWI x TSS x DLC(γ_{x0})	**Quantitative Workload x Total Social Support x Decision Latitude/Control**									3.25	-.03	.02	.19	**.034**	**.15**	**.40**
OCS x SS x DLC(γ_{x0})	**Organisational Constraints x Supervisor Support x Decision Latitude/Control**									3.24	.04	.02	.17	**.035**	**.19**	**.53**
ICAWS x CS x DLC(γ_{x0})	**Interpersonal Conflict x Co-Worker Support x Decision Latitude/Control**									3.32	.08	.03	.21	**.004**	**.23**	**.49**

$\pm F^2$ (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

The graphs in Figures 8.26, 8.27, 8.28, and 8.29 (next pages) all show buffering effects, albeit lacking clear interactions.

Figures 8.26 and 8.27 (next page) both show similar patterns as Figure 8.25, such that in the presence of higher levels of support, job satisfaction remains consistently higher at all levels of work stressors. This is suggestive of principally main effects of support on job satisfaction. Figure 8.28 shows that when co-worker support is low, there is no relationship between quantitative workload and job satisfaction. However, consistently with previous results, there is a positive association between the mentioned independent and dependent variables, when co-worker support is high.

Figure 8.29 shows that across all levels of interpersonal conflict at work, higher levels of decision latitude/control appear to maintain the same level of job satisfaction. In contrast, when decision latitude/control is low, job satisfaction goes down as interpersonal conflict increases.

Figure 8.26: Moderating Effect of Total Social Support on Job Satisfaction with Psychological Demands

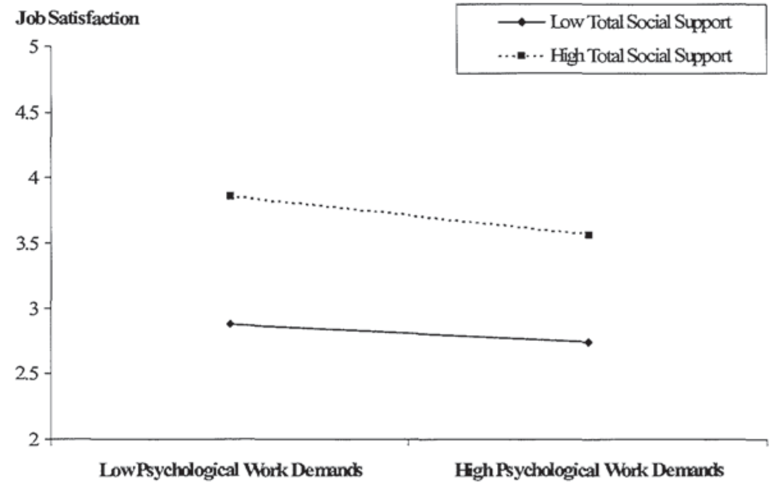


Figure 8.27: Moderating Effect of Co-Worker Support on Job Satisfaction with Physical Demands

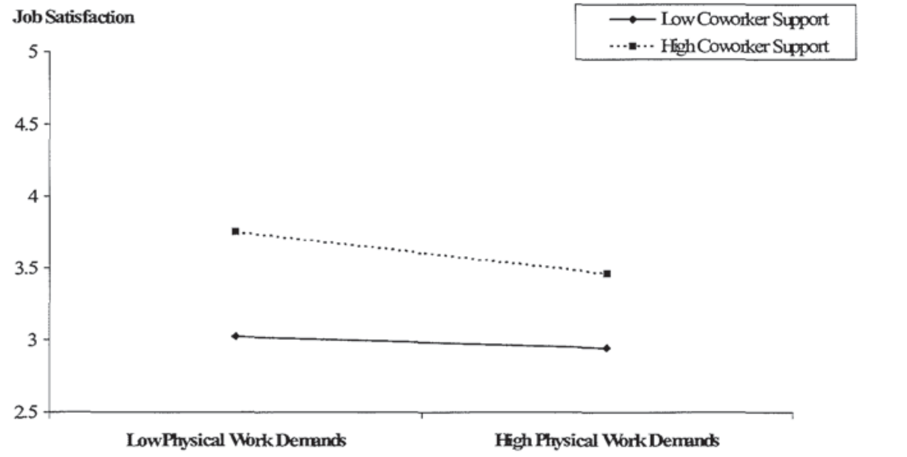


Figure 8.28: Moderating Effect of Co-Worker Support on Job Satisfaction with Quantitative Workload

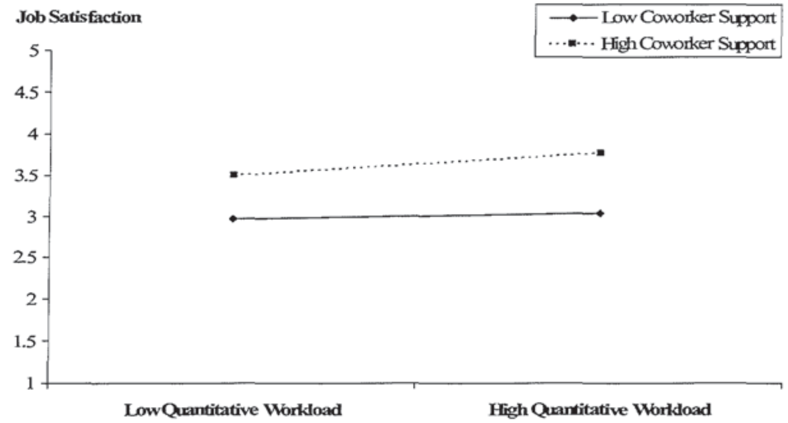


Figure 8.29: Moderating Effect of Decision Latitude/Control on Job Satisfaction with Interpersonal Conflict at Work

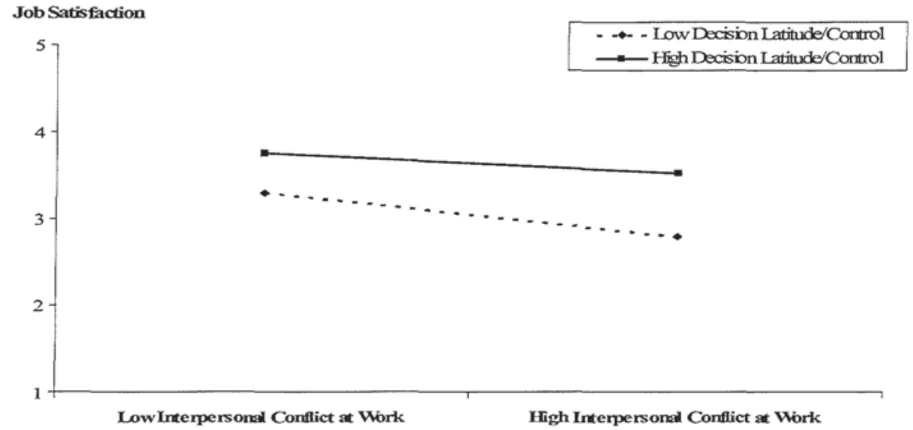
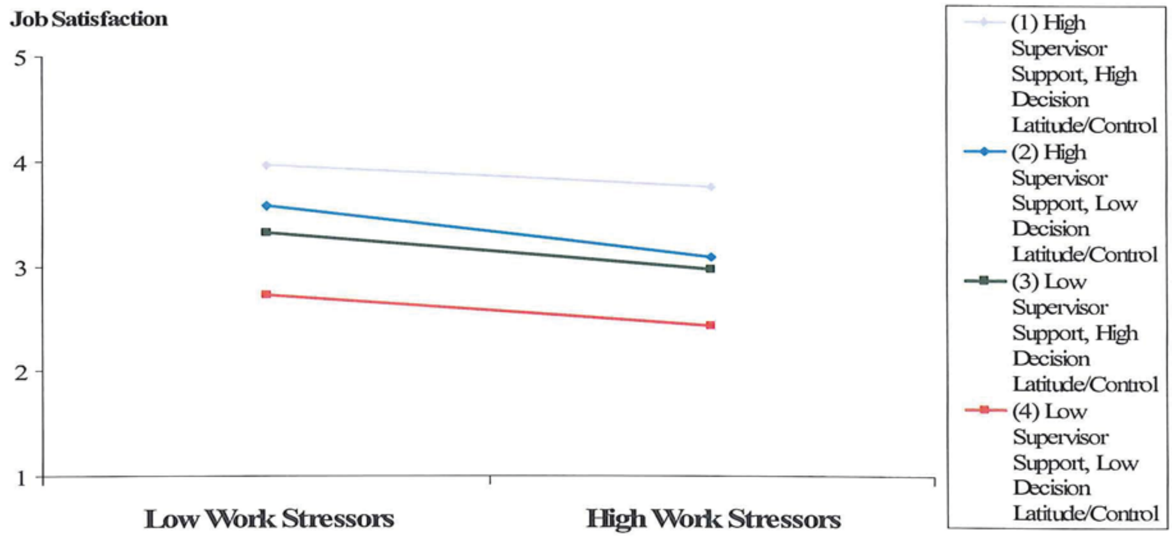


Table 8.25 also shows several significant three-way interactions, with medium/large effect sizes, namely, work stressors (composite) x supervisor support x decision latitude/control; nature of work x total social support x decision latitude/control; quantitative workload x total social support x decision latitude/control; organisational constraints x supervisor support x decision latitude/control; interpersonal conflicts x co-worker support x decision latitude/control. Figure 8.30 shows mainly main effects on job satisfaction. There is lower job satisfaction when work stressors increase.

Figure 8.30
Three-Way Interactions: Work Stressors x Supervisor Support x Decision Latitude/Control with Job Satisfaction as Dependent Variable



The graphs in Figures 8.31 and 8.33 (overleaf) show similar patterns, but are mirror images of each other, with the consistent finding that job satisfaction tends to be higher in units with higher quantitative workload.

Figure 8.31: Three-Way Interactions: Nature of Work x Total Social Support x Decision Latitude/Control (DL/C), Job Satisfaction as Dependent Variable (DV)

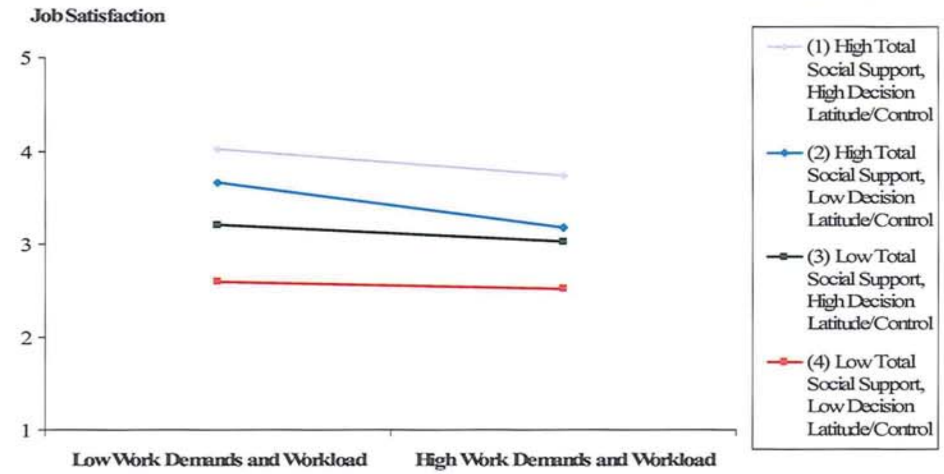


Figure 8.32: Three-Way Interactions: Quantitative Workload x Total Social Support x Decision Latitude/Control with Job Satisfaction as DV

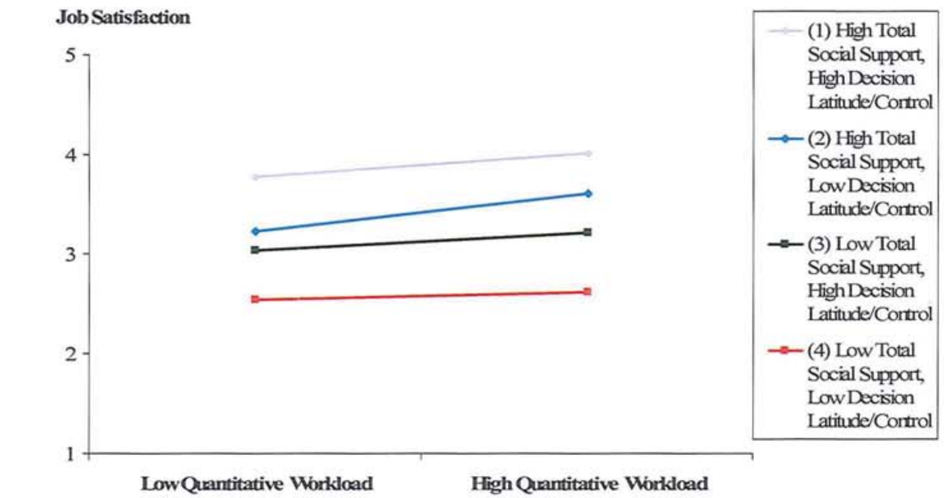


Figure 8.33: Three-Way Interactions: Organisational Constraints x Supervisor Support x Decision Latitude/Control with Job Satisfaction as DV

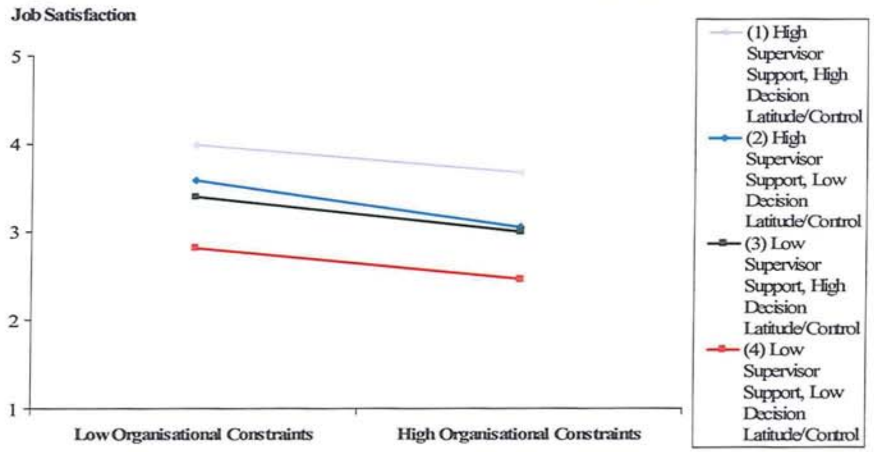
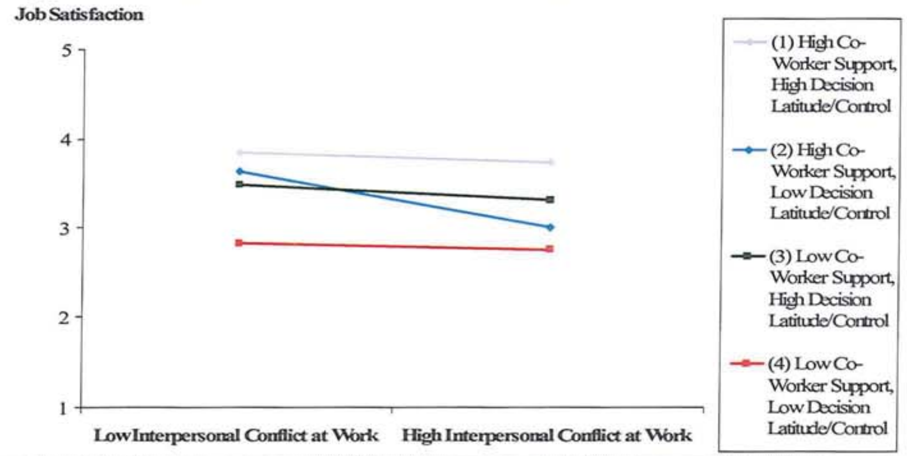


Figure 8.34: Three-Way Interactions: Interpersonal Conflict x Supervisor Support x Decision Latitude/Control with Job Satisfaction as DV



Higher levels in contrast to lower levels of the moderator variables consistently result into higher levels of job satisfaction across the levels of work stressors. However, the slopes for the outer linear relationships, as well for the one with low support and high decision latitude/control, are minimal. Consequently, any effects are due to main effects only. On the other hand, the linear relationship of job satisfaction with nature of work and quantitative workload is negative and positive respectively, when total social support is high and decision latitude/control is low. Figure 8.33 also shows largely main effects of supervisor support and DL/C with a decrease in job satisfaction as organisational constraints increase. There is an interaction effect between the two combinations of levels of supervisor support and DL/C. Figure 8.34 shows main effects on job satisfaction from the combined higher levels of the two moderator variables, namely co-worker support and decision latitude/control. There is, however, an interaction between the two combinations of levels of the two moderator variables. Indeed, with low co-worker support and high decision latitude/control, there is no relationship between interpersonal conflict and job satisfaction, which lies midway between the higher and the lower levels of the two moderator variables. Despite all of this, job satisfaction goes down, as interpersonal conflict increases, with high levels of co-worker support, and lower levels of decision latitude/control.

In summary, the buffering hypothesis with *job satisfaction* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships as specified in Table 8.25. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. The graphical representations, however, show a predominance of main effects by the moderator variables on job satisfaction.

8.3.3.4 Intention to Leave Job as Dependent Variable

Table 8.26 (next page) shows a summary of regression analyses including only the statistically significant two-way and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which are nearly all large. The significant two-way interactions include total social support with psychological demands, organisational constraints, and interpersonal conflict; supervisor support with work stressor composite, psychological demands, organisational constraints, interpersonal conflicts, and incidents at work; and co-worker support with interpersonal conflict. There are no significant two-way interactions involving decision latitude/control. Figure 8.35 shows that with low supervisor support, there is no relationship between total work stressors and intention to leave job. On the other hand, with high supervisor support, intention to leave job increases as work stressors increase. Irrespective of the level of work stressors, intention to leave job is lower than for those with high supervisor support, however this gap is greater when work stressors are low. Figures 8.36, 8.37, 8.38, 8.39, 8.40, 8.41, 8.42, and 8.43 (next pages) all show similar patterns.

Figure 8.35
Moderating Effect of Supervisor Support on Intention to Leave Job with Work Stressors

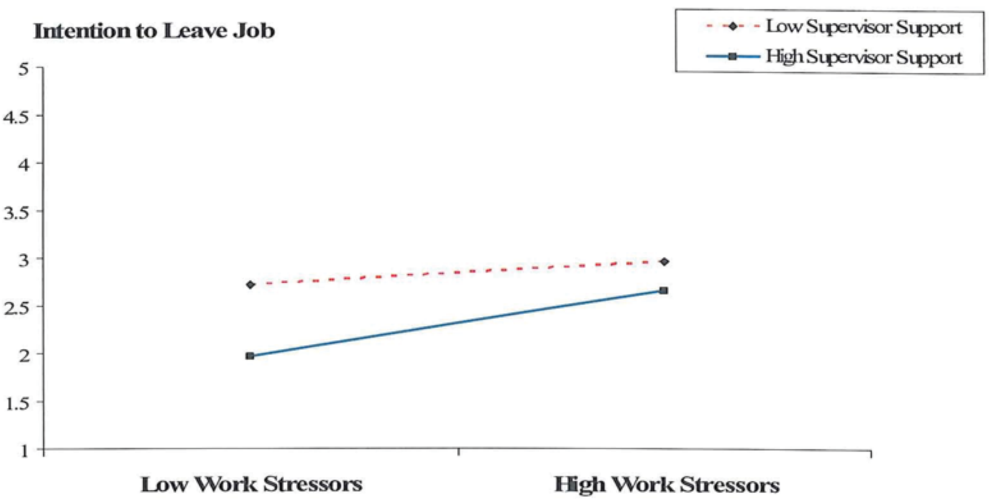


Table 8.26

Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Intention to Leave Job,

(Only statistically-significant two-way and three-way interactions are listed)

Variable		Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	F^2
		γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable																	
Intention to Leave Job		2.63	.06	1.34											.000		
Model 2: Intermediate Model With All Control Variables																	
Constant					(γ_{00}) 2.57	.08									.000		
Age					(γ_{10}) -.03	.07									.633		
Gender					(γ_{20}) -.13	.04									.004		
Marital Status					(γ_{30}) -.04	.04									.320		
Employment Contract					(γ_{40}) -.05	.03									.136		
Professional Group					(γ_{50})- .16	.05									.001		
Years Health Care					(γ_{60}) -.08	.07									.230		
Years in Unit					(γ_{70}) .01	.04									.746		
Level-2 Unit Size(w_j)					(γ_{01}) .00	.00									.250		
σ^2 for Model 2					1.25												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																	
WStres x SS	**Work Stress Composite x Supervisor Support**						2.52	.11	.03	1.05					**.002**	**.17**	**.24**
PsyD x TSS	**Psychological Demands x Total Social Support**						2.61	.08	.04	1.06					**.030**	**.13**	**.17**
PsyD x SS	**Psychological Demands x Supervisor Support**						2.60	.07	.03	1.09					**.025**	**.12**	**.16**
OCS x TSS	**Organisational Constraints x Total Social Support**						2.56	.08	.04	1.03					**.048**	**.18**	**.26**
OCS x SS	**Organisational Constraints x Supervisor Support**						2.57	.12	.04	1.03					**.002**	**.13**	**.17**
ICAWS x TSS	**Interpersonal Conflict x Total Social Support**						2.56	.12	.04	1.05					**.001**	**.15**	**.21**
ICAWS x SS	**Interpersonal Conflict x Supervisor Support**						2.56	.12	.04	1.05					**.002**	**.16**	**.22**
ICAWS x CS	**Interpersonal Conflict x Co-Worker Support**						2.51	.11	.04	1.09					**.004**	**.14**	**.19**
INCID x SS	**Incidents at Work x Supervisor Support**						2.58	.09	.05	1.06					**.050**	**.13**	**.17**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																	
QualW x TSS x DLC	**Qualitative Workload x Total Social Support x Decision Latitude/Control**										2.54	-.08	.04	.97	**.029**	**.08**	**.12**

± F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

Figure 8.36: Moderating Effect of Total Social Support on Intention to Leave Job with Psychological Demands

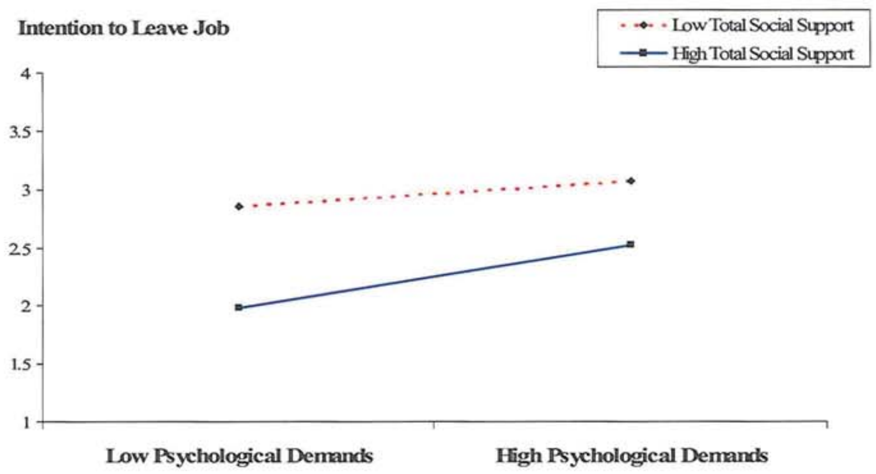


Figure 8.37: Moderating Effect of Supervisor Support on Intention to Leave Job with Psychological Demands

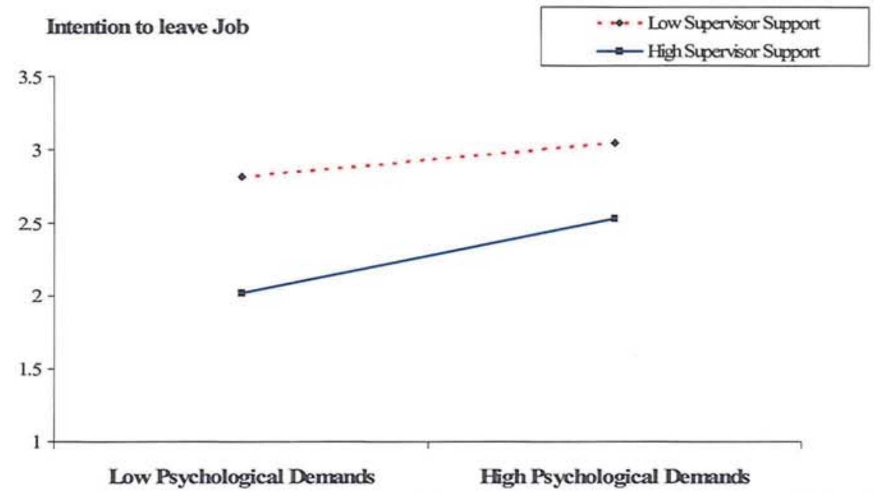


Figure 8.38: Moderating Effect of Total Social Support on Intention to Leave Job with Organisational Constraints

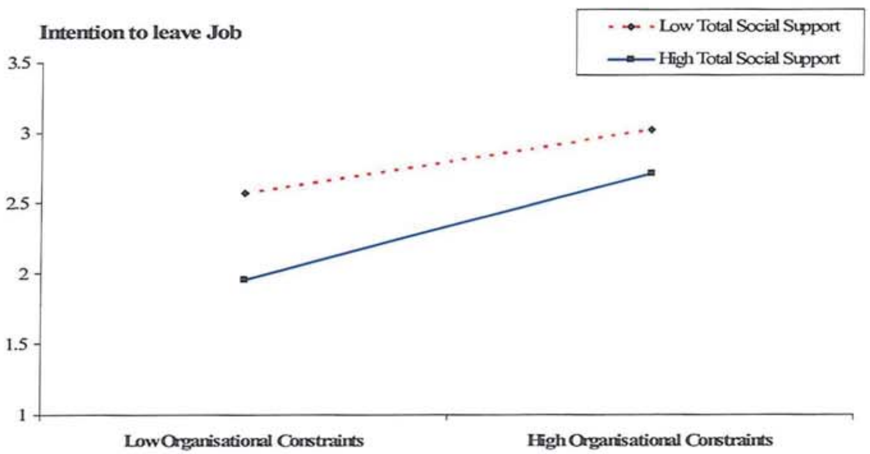


Figure 8.39: Moderating Effect of Supervisor Support on Intention to Leave Job with Organisational Constraints

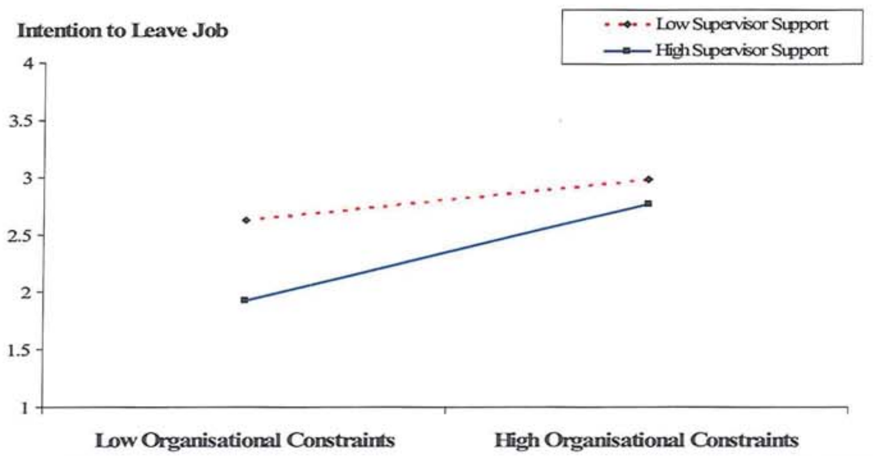


Figure 8.40: Moderating Effect of Total Social Support on Intention to Leave Job with Interpersonal Conflict at Work

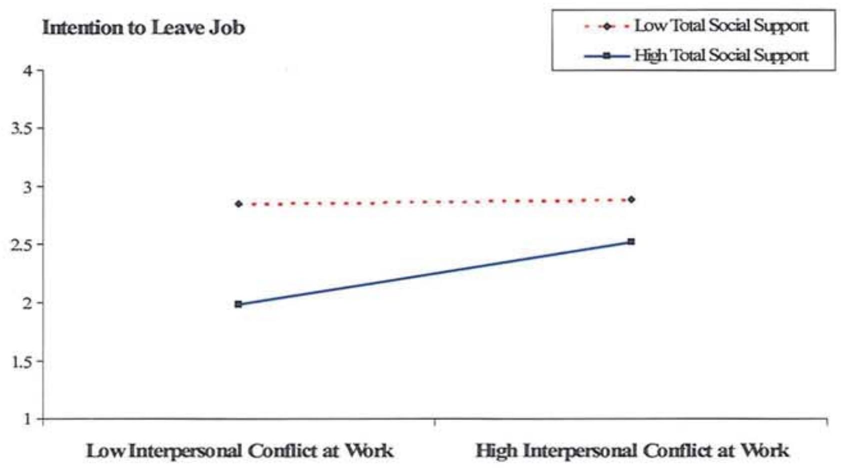


Figure 8.41: Moderating Effect of Supervisor Support on Intention to Leave Job with Interpersonal Conflict at Work

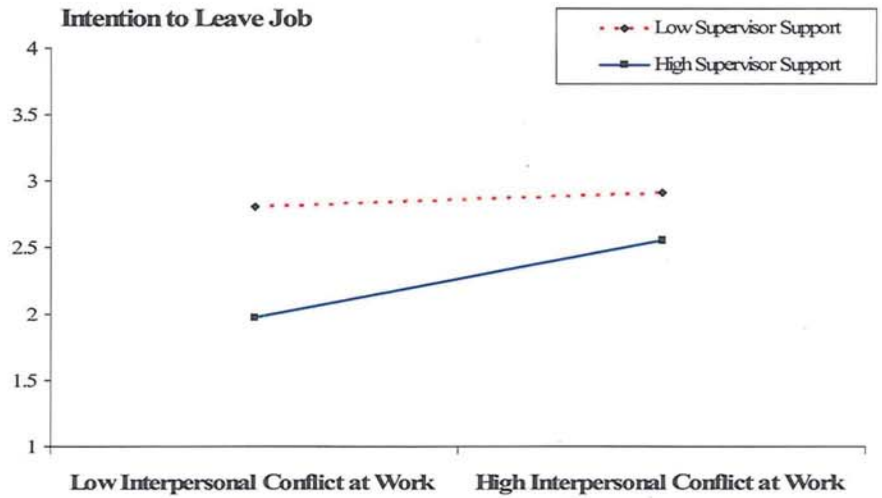


Figure 8.42: Moderating Effect of Co-Worker Support on Intention to Leave Job with Interpersonal Conflict at Work

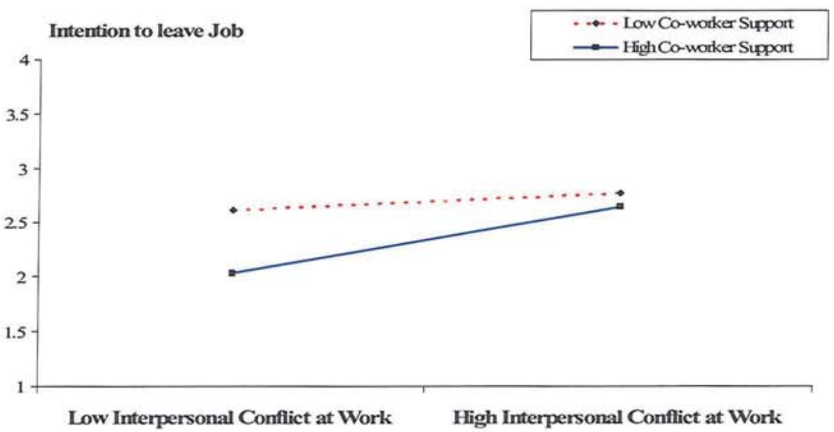


Figure 8.43: Moderating Effect of Supervisor Support on Intention to Leave Job with Incidents at Work

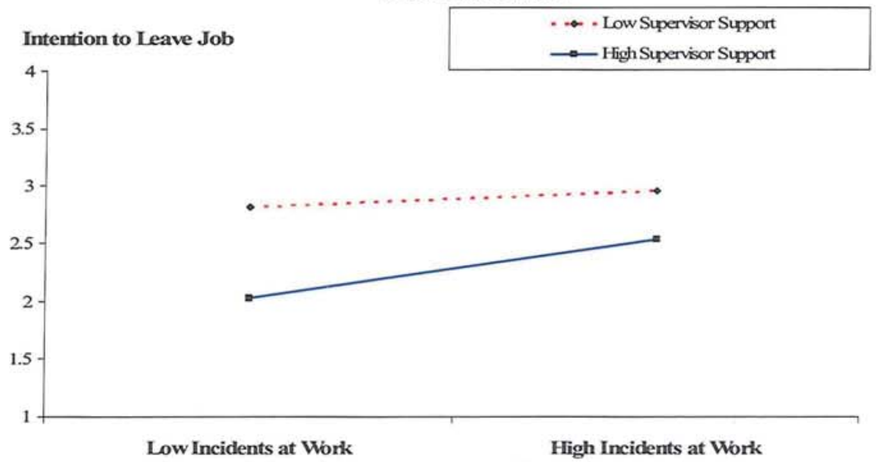
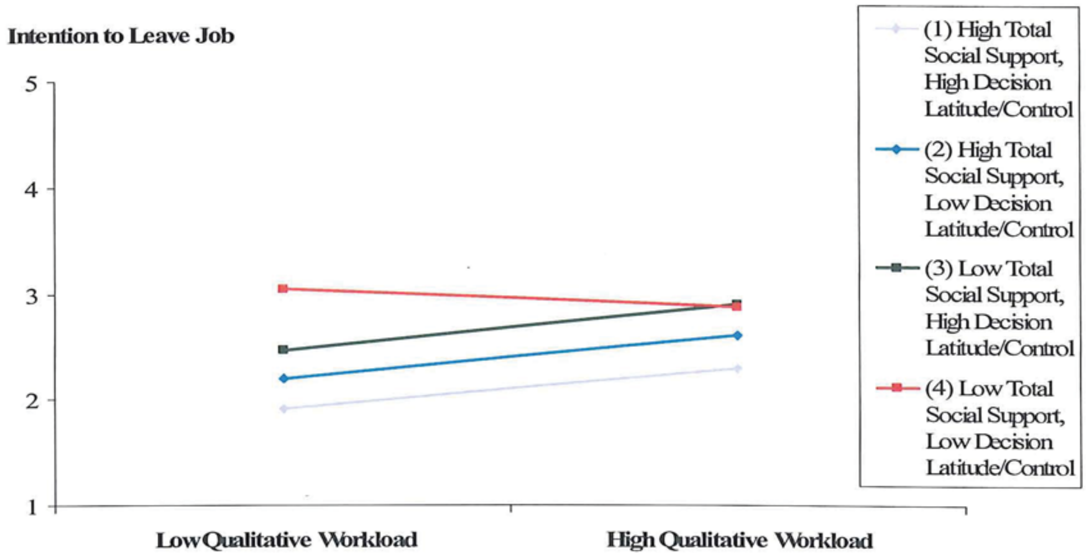


Table 8.26 shows only one significant three-way interaction, with small to medium effect size (Figure 8.44). Intention to leave job is lowest with low qualitative workload, high social support and high decision latitude/control. Intention to leave job is highest with low qualitative workload, and low social support and low decision latitude/control. With low levels of total (supervisor and co-worker) support and decision latitude/control, there is a very small decrease (almost no relationship) in the relationship between intention to leave job and qualitative workload. In contrast, for the other combinations, there is a small positive association between qualitative workload and intention to leave job. When the levels of the moderator variables are high, intention to leave job is lowest across all levels of qualitative workload. However, total social support shows a greater buffering effect than decision latitude/control.

Figure 8.44
Three-Way Interactions: Qualitative Workload x Total Social Support x Decision Latitude/Control with Intention to Leave Job as Dependent Variable



<u>In summary</u>, the buffering hypothesis with *intention to leave job*, as an outcome variable can only be *partially accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.26. Indeed, there are a number of significant two-way interactions involving social support and decision latitude/control as moderators, but only one significant three-way interaction.

8.3.3.5 Burnout as Dependent Variable

Table 8.27 (next page) shows a summary of regression analyses, including only the statistically significant interactions. The effect sizes vary from small to medium, to large.

The significant two-way interactions include total social support with interpersonal conflicts; and decision latitude/control with psychological demands and with stress from organisational change. Figure 8.45 provides the graphical representations of the statistically significant two-way interactions with the dependent variable being the composite score of burnout. In all the three graphs, burnout is lowest for the higher level of the moderator across all levels of work stressor. Graph A shows a positive association between the interpersonal conflict and burnout, with those perceiving a high total social support, having a steeper slope. The difference in burnout between those perceiving low and high total social support is greater for those with low interpersonal conflict. Graph B also shows a positive association between psychological demands and burnout but with a steeper slope in low decision latitude/control. The difference in burnout between those perceiving low and high decision latitude/control is greater for those with high psychological demands. Graph C shows a similar pattern to Graph B, but the difference in burnout between those perceiving low and high decision latitude/control is minimal for those with low stress from organisational change.

Table 8.27

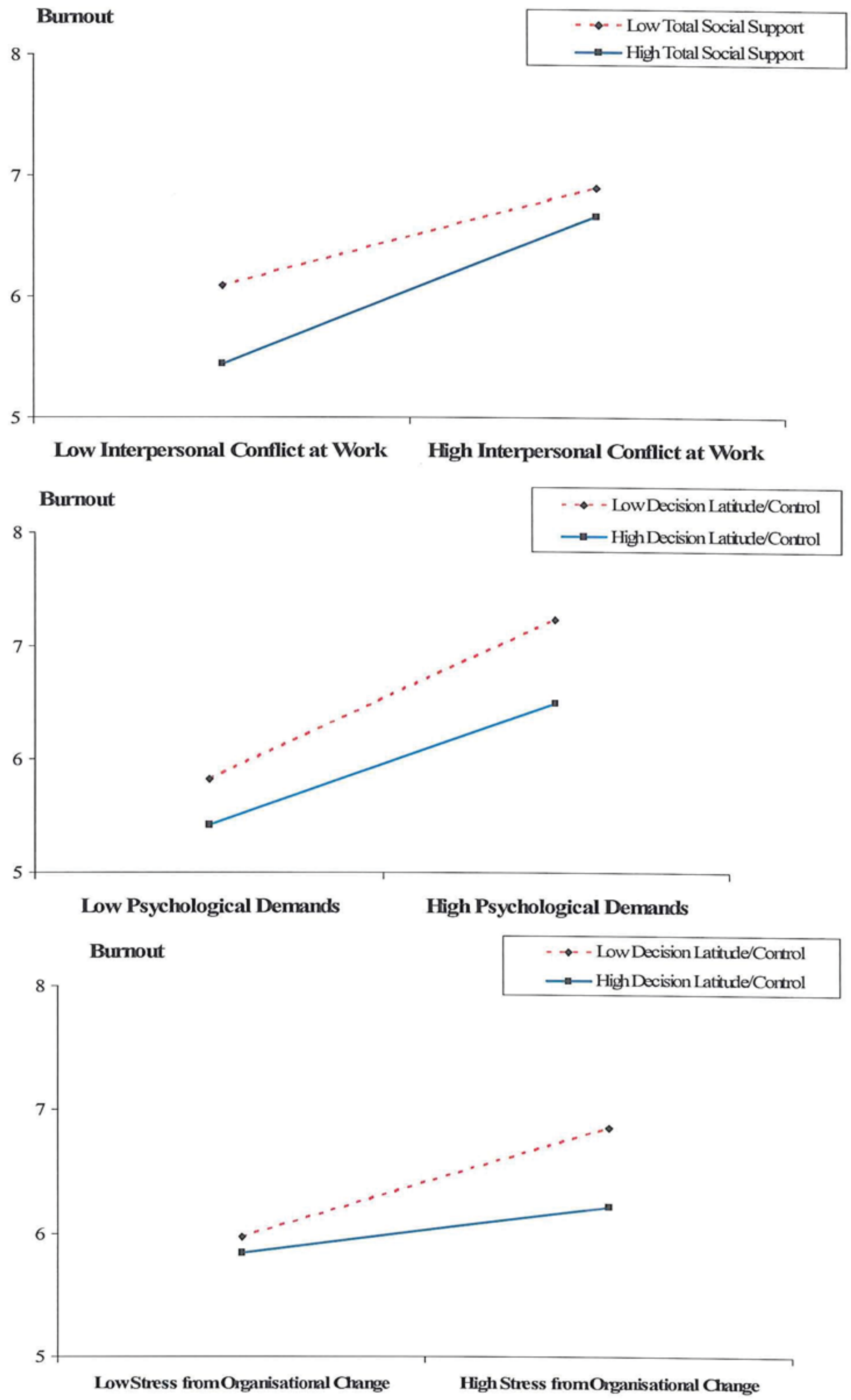
Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting <u>Burnout</u>

(Only statistically-significant two-way and three-way interactions are listed)

Variable	Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	F^2
	γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable																
Burnout	6.33	.07	1.996											.000		
Model 2: Intermediate Model With All Control Variables																
Constant				(γ_{00}) 6.31	.10									.000		
Age				(γ_{10}) -.23	.08									.003		
Gender				(γ_{20}) -.17	.05									.000		
Marital Status				(γ_{30}) .04	.05									.493		
Employment Contract				(γ_{40}) -.13	.04									.003		
Professional Group				(γ_{50})- .06	.05									.201		
Years Health Care				(γ_{60})- .01	.08									.857		
Years in Unit				(γ_{70}) .00	.06									.987		
Level-2 Unit Size (w_j)				(γ_{01}) .00	.00									.676		
σ^2 for Model 2				1.85												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																
ICAWS x TSS — Interpersonal Conflict at work x Total Social Support						6.28	.10	.05	1.32					.025	.36	.41
PsyD x DLC — Psychological Demands x Decision Latitude/Control						6.24	-.08	.04	1.37					.034	.10	.16
Move x DLC — Organisational Change x Decision Latitude/Control						6.22	-.13	.06	1.41					.021	.19	.27
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																
NOW x SS x DLC — Nature of Work x Supervisor Support x Decision Latitude/Control										6.30	-.10	.05	.95	.031	.12	.26
PhysD x SS x DLC — Physical Demands x Supervisor Support x Decision Latitude/Control										6.36	-.10	.04	1.18	.009	.13	.22
OCS x TSS x DLC — Organisational Constraints x Total Social Support x Decision Latitude/Control										6.22	-.06	.03	1.00	.027	.09	.18
OCS x SS x DLC — Organisational Constraints x Total Social Support x Decision Latitude/Control										6.17	-.08	.03	.95	.024	.11	.24
Move x SS x DLC — Organisational Change x Supervisor Support x Decision Latitude/Control										6.27	-.16	.06	1.15	.006	.11	.18
Move x CS x DLC — Organisational Change x Co-Worker Support x Decision Latitude/Control										6.25	.15	.05	1.15	.007	.14	.25

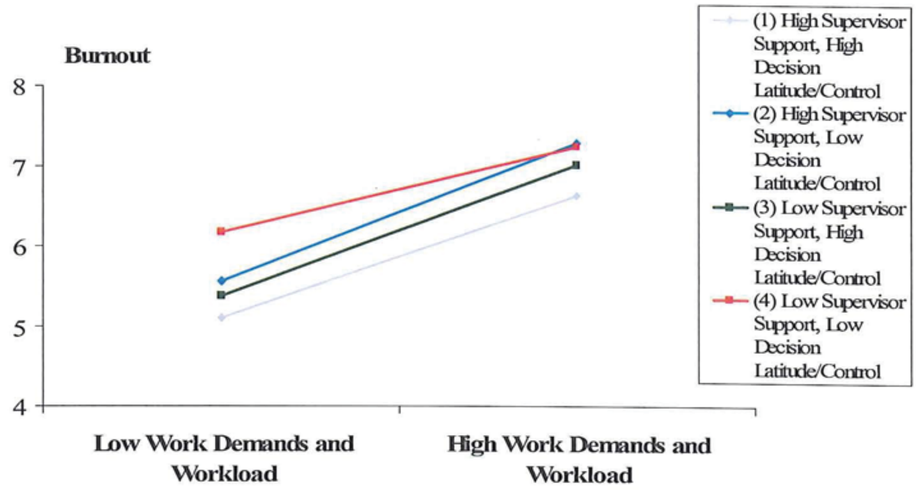
± F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

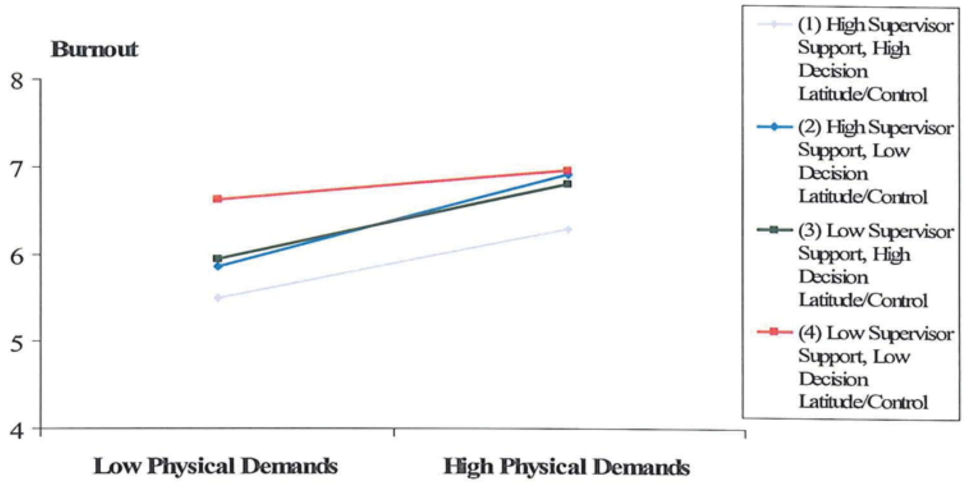
Figure 8.45: Two-Way Interactions: <u>A.</u> Interpersonal Conflict at Work x Total Social Support; <u>B.</u> Psychological Demands x Decision Latitude/Control; and <u>C.</u> Stress from Organisational Change as a result of Move to New Hospital Site x Decision Latitude/Control, with Burnout as Dependent Variable



Figures 8.46, 8.47, 8.48, 8.49, and 8.50 (next pages) show the three-way interactions.

Figure 8.46: Three-Way Interactions: A. Nature of Work x Supervisor Support x Decision Latitude/Control; and B. Physical Demands x Supervisor Support x Decision Latitude/Control, with Burnout as Dependent Variable





The two graphs in Figure 8.46 show that for all four combinations in the levels of the two moderator variables, there are positive associations in the linear relationships between the specific work stressors and burnout. Invariably, the level of burnout is highest with higher levels of work stressors and lowest levels of moderator variables. Although higher levels of supervisor support in the presence of low DL/C gave higher levels of burnout with high levels of organisational constraints and high level of stress due to proposed move.

Figure 8.47: Moderating Effect of Total Social Support on Burnout with Organisational Constraints

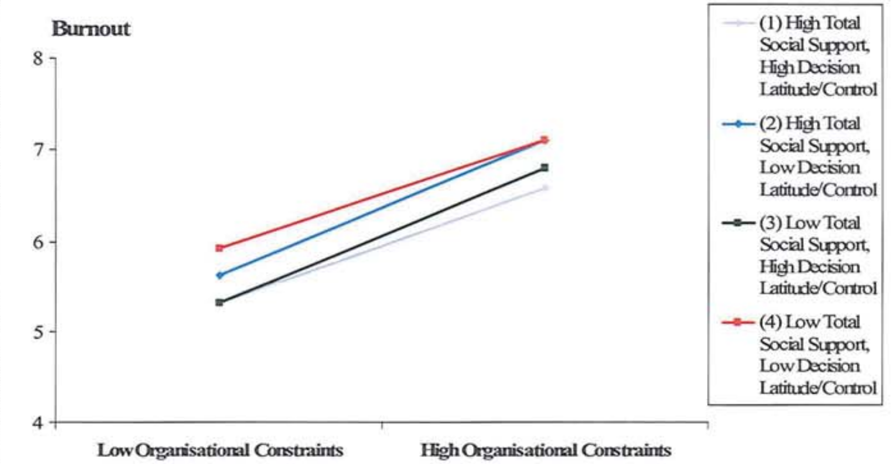


Figure 8.48: Moderating Effect of Supervisor Support on Burnout with Organisational Constraints

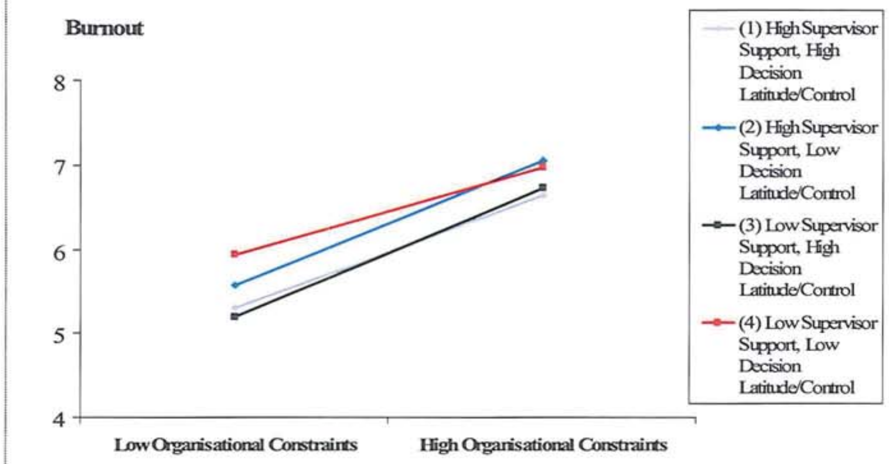


Figure 8.49: Moderating Effect of Supervisor Support on Burnout with Stress due to Organisational Change

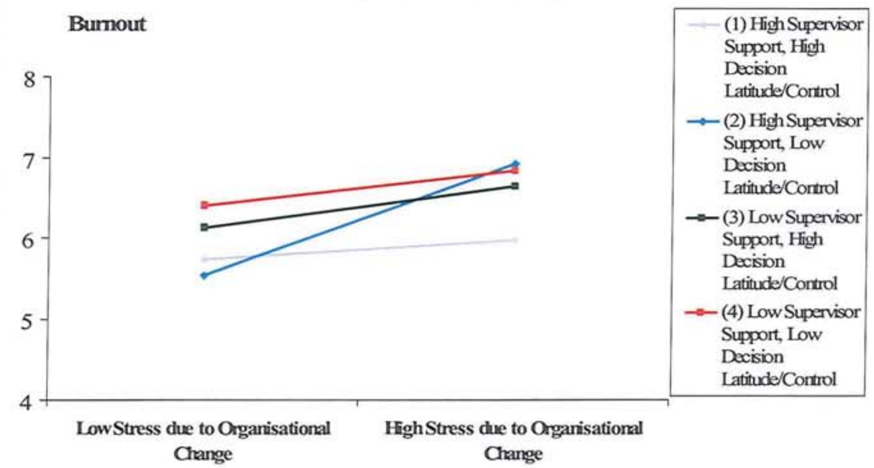
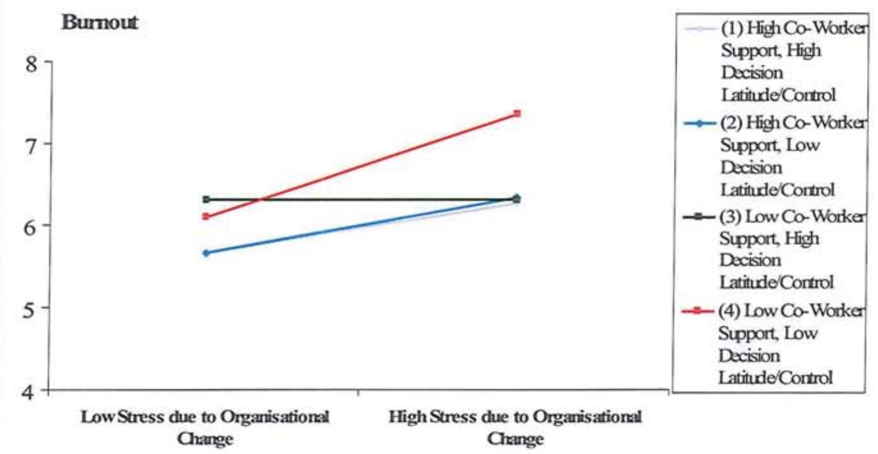


Figure 8.50: Moderating Effect of Supervisor Support on Intention to Leave Job with Incidents at Work



The level of burnout is lowest across all levels of work stressors, in the presence of higher levels of the moderator variables, namely, support and decision latitude/control. The converse is true for the lower levels of moderator variables. The gap between the two is greater at the lower levels of the stressors than at the higher levels. In between the two outer linear relationships, 8.46(A) shows that decision latitude/control lowers burnout more than supervisor support, whereas 8.46(B) shows almost no difference such that the two middle linear relationships interact.

Figure 8.47 (p.367) shows parallel linear relationships between the higher and the lower levels of the combined moderator variables, with the higher levels resulting in lower levels of burnout across all levels of organisational constraints. The two middle linear relationships are also parallel to each other, with high decision latitude/control being more influential than total social support at achieving lower levels of burnout, across all levels of organisational constraints. However, when organisational constraints are high, the level of burnout is further reduced, when in addition to high decision latitude/control (green line), there is also high total social support (purple line). The lowering of burnout is greater when in addition to high total social support (blue line), there is also high level of decision latitude/control (purple line) in the presence of high organisational constraints.

Figure 8.48 shows a similar pattern, except that the outer two linear positive relationships are not parallel but move closer to each other in the presence of high level of organisational constraints. Additionally, when the level of organisational constraints is low, the presence of combined high decision latitude/control and low supervisor support achieves the lower level of burnout. At the higher level of organisational constraints, however, the combined high levels of supervisor support and decision latitude/control achieve the lowest level burnout. Figures 8.49 and 8.50, show that the higher levels of moderator variables are associated with lower level of burnout, when the level of the stressor is high. In both, there is evidence of slope difference between the linear relationships. Furthermore, Figure 8.50 shows that despite the perceived low level of co-worker support, high decision latitude/control maintained a steady level of burnout irrespective of the perceived level of stress due to organisational change.

In summary, the buffering hypothesis with *burnout (composite)* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.27. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. The graphical representations clearly show the interactions involving the two moderator variables.

8.3.3.6 Emotional Exhaustion as Dependent Variable

Table 8.28 (next page) shows a summary of regression analyses including only the statistically significant two- and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which vary from small to medium, to large. The significant two-way interactions include total social support with psychological demands, and physical demands; supervisor support with psychological demands, physical demands, and interpersonal conflicts; co-worker support with physical demands and interpersonal conflict, and decision latitude/control with stress from organisational change. Figures 8.51, 8.52, 8.53 (next pages) provide graphical representations of the interactions.

Table 8.28

Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Emotional Exhaustion,

(Only statistically-significant two-way and three-way interactions are listed)

Variable		Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	F^2
		γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable																	
Emotional Exhaustion		**3.07**	**.05**	**0.68**											**.000**		
Model 2: Intermediate Model With All Control Variables																	
Constant					(γ_{00}) 3.03	.06									.000		
Age					(γ_{10}) -.19	.04									.633		
Gender					(γ_{20}) -.02	.03									.000		
Marital Status					(γ_{30}) .02	.03									.574		
Employment Contract					(γ_{40}) -.11	.03									.000		
Professional Group					(γ_{50})- .06	.04									.106		
Years Health Care					(γ_{60}) .11	.05									.039		
Years in Unit					(γ_{70}) .01	.04									.746		
Level-2 Unit Size (w_j)					(γ_{01}) .02	.04									.559		
σ^2 for Model 2					**0.70**												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																	
PsyD x TSS	**Psychological Demands x Total Social Support**						3.05	.06	.01	.48					**.022**	**.34**	**.62**
PsyD x SS	**Psychological Demands x Supervisor Support**						3.05	.07	.03	.52					**.027**	**.22**	**.33**
PhysD x TSS	**Physical Demands x Total Social Support**						3.08	.07	.03	.56					**.037**	**.20**	**.29**
PhysD x SS	**Physical Demands x Supervisor Support**						3.08	.07	.04	.54					**.055**	**.21**	**.31**
PhysD x CS	**Physical Demands x Co-Worker Support**						3.07	.07	.03	.58					**.013**	**.16**	**.22**
ICAWS x SS	**Interpersonal Conflict x Supervisor Support**						3.02	.07	.03	.51					**.032**	**.23**	**.35**
ICAWS x CS	**Interpersonal Conflict x Co-Worker Support**						3.03	.05	.03	.54					**.047**	**.20**	**.29**
Move x DLC	**Organisational Change x Decision Latitude/Control**						3.01	-.09	.04	.55					**.023**	**.16**	**.22**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																	
PhysD x SS x DLC	**Physical Demands x Supervisor Support x Decision Latitude/Control**										3.08	-.05	.03	.45	**.040**	**.10**	**.17**
QWI x TSS x DLC	**Quantitative Workload x Total Social Support x Decision Latitude/Control**										3.05	.05	.02	.39	**.010**	**.07**	**.14**
QWI x CS x DLC	**Quantitative Workload x Co-Worker Support x Decision Latitude/Control**										3.04	.04	.02	.40	**.037**	**.08**	**.12**
Move x SS x DLC	**Organisational Change x Supervisor Support x Decision Latitude/Control**										3.03	-.07	.03	.47	**.039**	**.05**	**.08**

± F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

Figure 8.51: Two-Way Interactions with Emotional Exhaustion as Dependent Variable: A. Psychological Demands x Total Social Support; B. Psychological Demands x Supervisor Support; C. Physical Demands x Total Social Support; and D. Physical Demands and Supervisor Support.

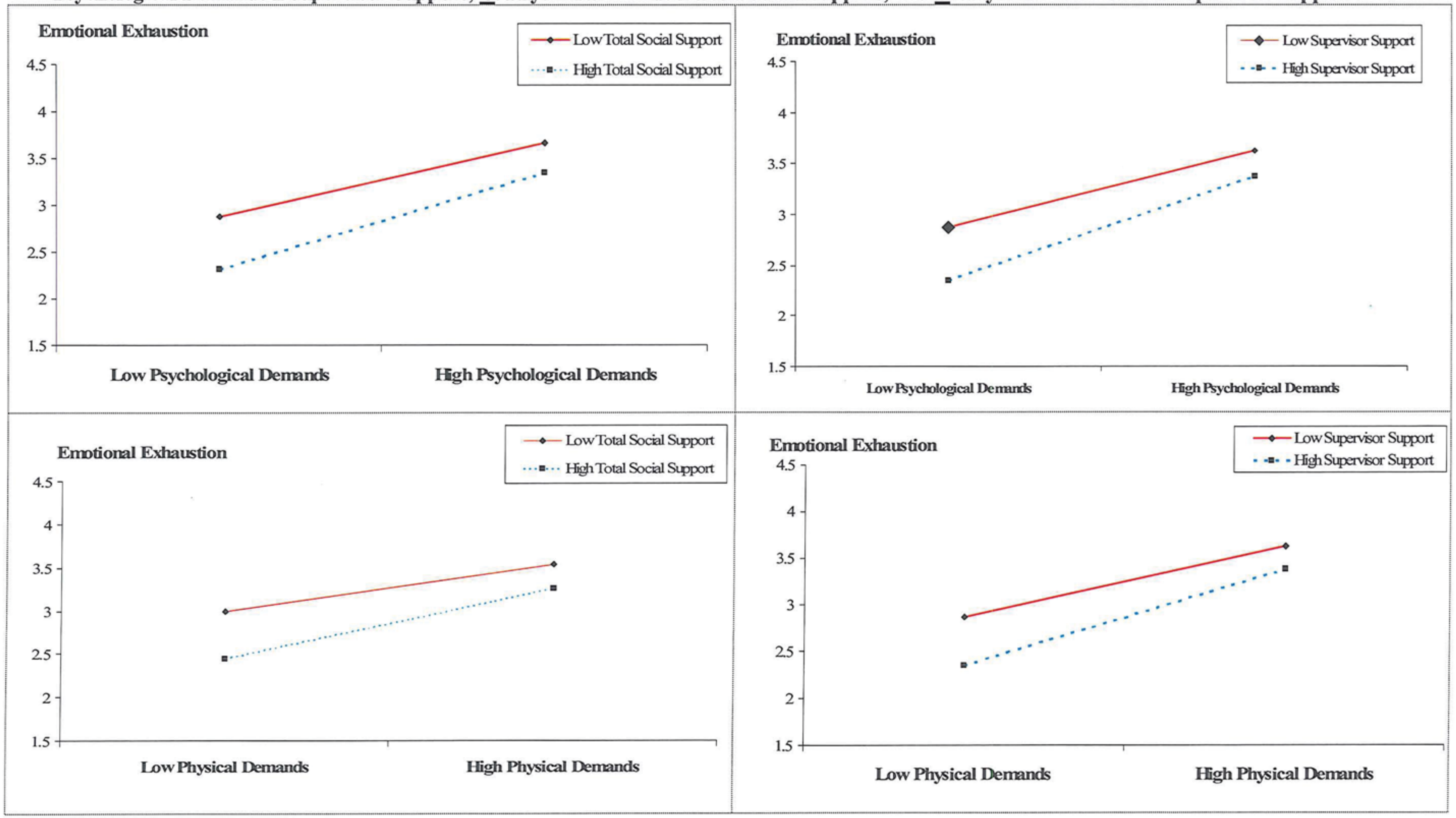


Figure 8.52: Two-Way Interactions with Emotional Exhaustion as Dependent Variable: A. Physical Demands x Co-Worker Support; B. Interpersonal Conflict x Supervisor Support; C. Interpersonal Conflict x Co-Worker Support; and D. Organisational Change x Decision Latitude/Control

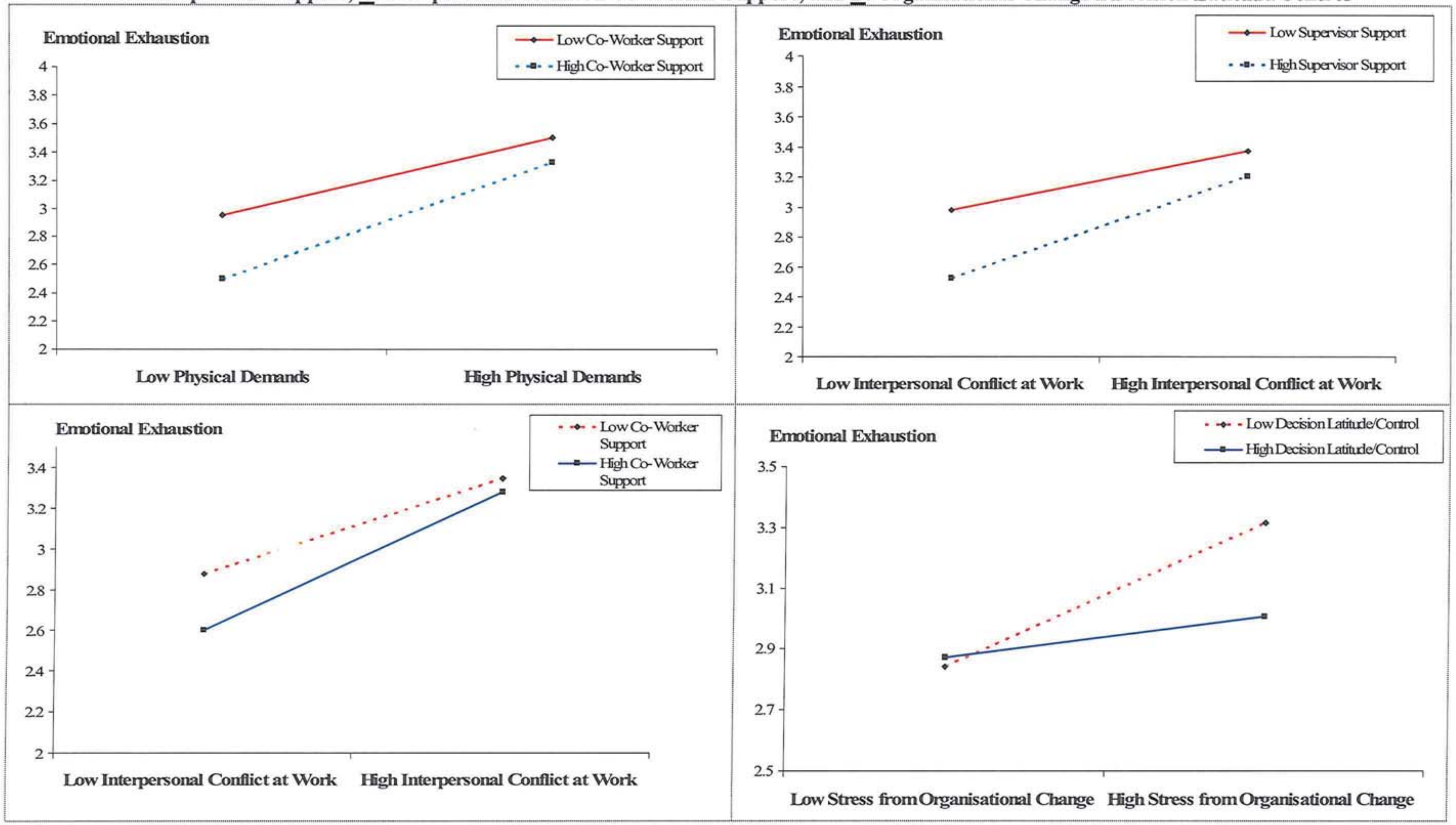


Figure 8.53: Three-Way Interactions with Emotional Exhaustion as Dependent Variable: A. Physical Demands x Supervisor Support x Decision Latitude/Control; B. Quantitative Workload x Total Social Support x Decision Latitude/Control; C. Quantitative Workload x Co-Worker Support x Decision Latitude/Control; and D. Organisational Change x Supervisor Support x Decision Latitude/Control.

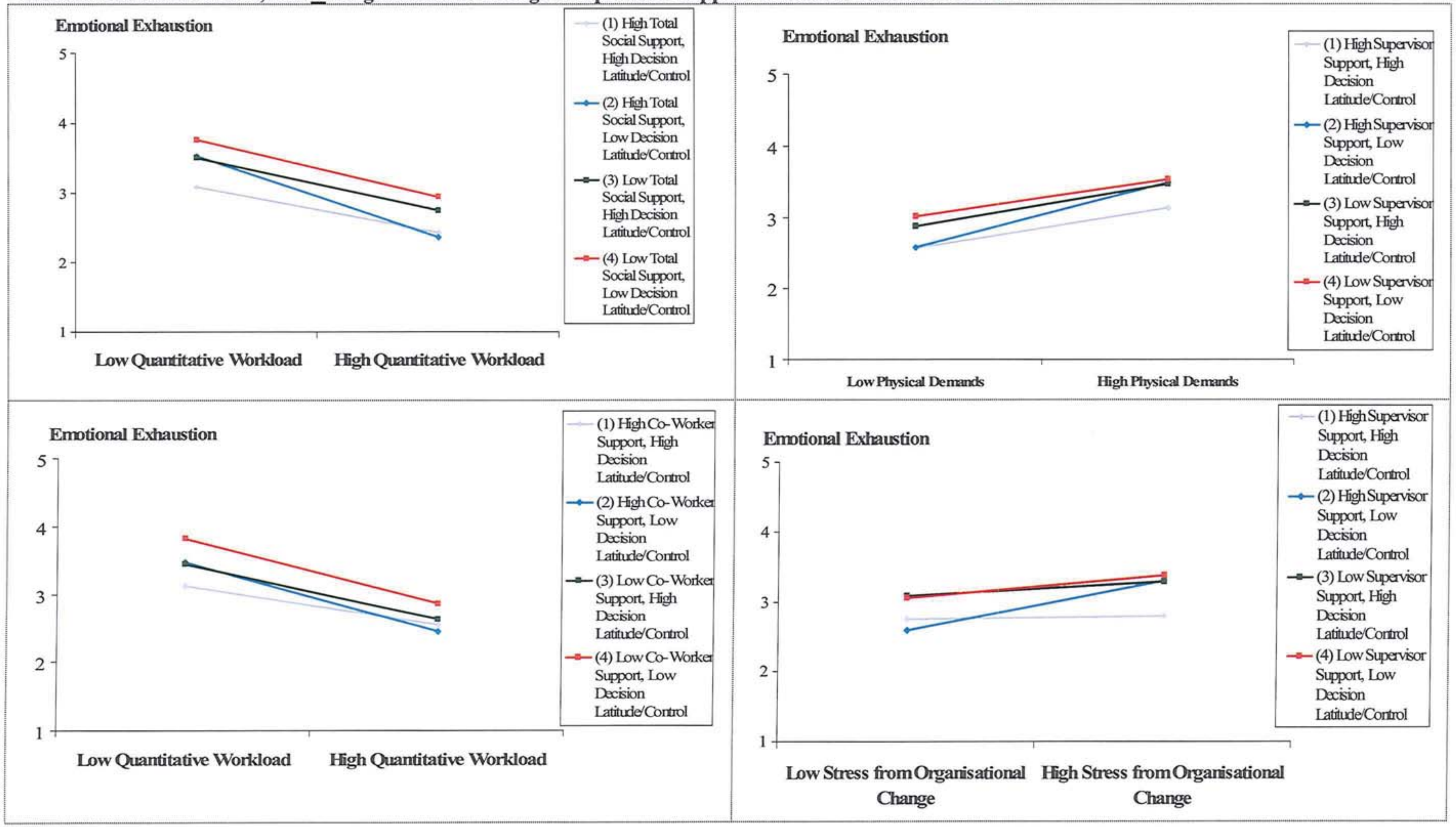


Figure 8.51 illustrates four specific statistically significant two-way interactions with emotional exhaustion as the dependent variable. The type of support that is moderating the stressor-strain relationships is mainly supervisor support. The graphs all have the same pattern in that, in general, there is a positive association between emotional exhaustion and psychological and physical demands. However, the slopes are steeper with high total social support and high supervisor support across the four graphs. Indeed, at the lower end of demands, there is a greater difference in emotional exhaustion between the levels of the moderator. Figure 8.52 also includes four graphs, with the first three being similar in pattern to the ones in Figure 8.51. The last graph, however, shows a more clear interaction, such that the stressor-strain relationship is minimised in the presence of high decision latitude/control.

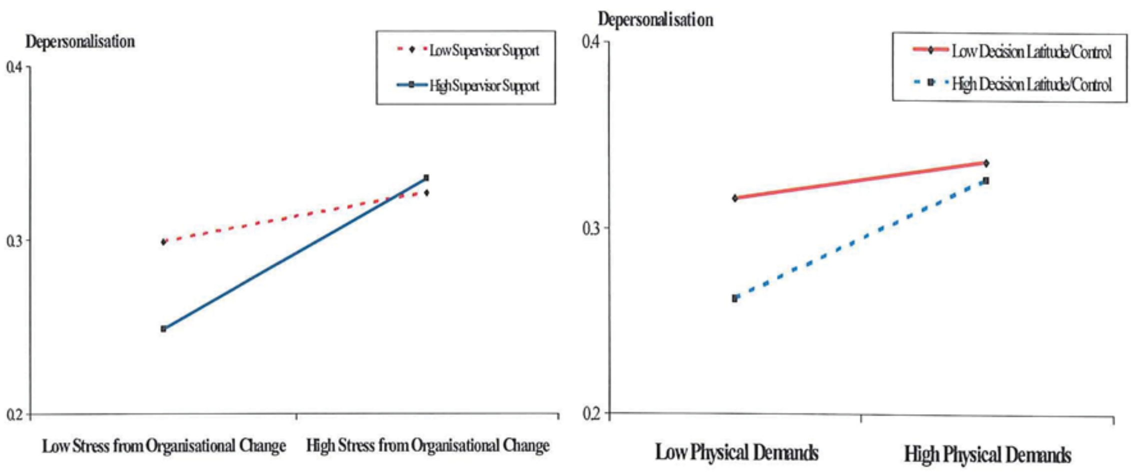
Table 8.28 also shows several significant three-way interactions, with small to medium effect sizes. The four graphs in Figure 8.53 illustrate the significant three-way interactions. In general, there is a negative association between quantitative workload and emotional exhaustion that is consistent with previous results. Emotional exhaustion is lowest with high levels of the moderator variables. There is a positive association between physical demands and emotional exhaustion, which is lowest with the higher levels of the moderators, namely, supervisor support and decision latitude/control. With higher levels of the moderator variables, there is no relationship between stress from organisational change and emotional exhaustion. There is however a small positive relationship for the other different combinations of moderator variables.

<u>In summary,</u> the buffering hypothesis with *emotional exhaustion* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.28. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. Some of the graphical representations clearly show the interactions involving the two moderator variables.

8.3.3.7 Depersonalisation as Dependent Variable

Table 8.29 (next page) shows a summary of regression analyses, including only the statistically significant two- and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which vary from small-medium, to medium-large. The graphs (A) and (B) in Figure 8.54 show similar patterns indicating that there are positive relationships between the work stressor and depersonalisation. The slopes are much steeper when supervisor support is high in (A) and decision latitude/control is high in (B) relative to their respective lower levels. Therefore, the two moderators fail to act as buffers at the higher levels of the specific work stressor.

Figure 8.54: Two-Way Interactions: <u>A.</u> Move to New Hospital Stress x Supervisor Support, and <u>B.</u> Physical Demands x Decision Latitude/Control with Depersonalisation as Dependent Variable



Figures 8.55, 8.56, and 8.57 (next pages) show a number of three-way interactions.

Table 8.29: Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Depersonalisation
(Only statistically-significant two-way and three-way interactions are listed)

Variable	Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	F^2
	Γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable																
Depersonalisation	.31	.01	.0223											**.000**		
Model 2: Intermediate Model With All Control Variables																
Constant				(γ_{00}) -.01	.01									.000		
Age				(γ_{10}) -.01	.01									.143		
Gender				(γ_{20}) -.03	.01									.000		
Marital Status				(γ_{30}) .00	.01									.661		
Employment Contract				(γ_{40}) -.01	.01									.067		
Professional Group				(γ_{50})- .01	.01									.028		
Years Health Care				(γ_{60}) .11	.05									.039		
Years in Unit				(γ_{70}) .01	.01									.410		
Level-2 Unit Size (w_j)				(γ_{01}) -.00	.00									.334		
σ^2 for Model 2				**0.0196**												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																
Move x SS	**Organisational Change x Supervisor Support**					.30	.15	.01	.02					**.006**	**.13**	**.18**
PhysD x DLC	**Physical Demands x Decision Latitude/Control**					.31	.01	.01	.02					**.030**	**.05**	**.06**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																
WStres x TSS x DLC	**Work Stress Composite x Total Social Support x Decision Latitude/Control**									.31	-.01	.004	.013	**.028**	**.09**	**.16**
WStres x SS x DLC	**Work Stress Composite x Supervisor Support x Decision Latitude/Control**									.30	-.01	.004	.013	**.003**	**.08**	**.14**
NOW x TSS x DLC	**Nature of Work x Total Social Support x Decision Latitude/Control**									.30	-.01	.004	.014	**.001**	**.13**	**.21**
NOW x SS x DLC	**Nature of Work x Supervisor Support x Decision Latitude/Control**									.30	-.01	.004	.015	**.031**	**.14**	**.23**
NOW x CS x DLC	**Nature of Work x Co-Worker Support x Decision Latitude/Control**									.30	-.01	.004	.015	**.022**	**.09**	**.15**
PhysD x CS x DLC	**Physical Demands x Co-Worker Support x Decision Latitude/Control**									.30	-.01	.005	.015	**.014**	**.16**	**.25**
QWI x SS x DLC	**Quantitative Workload x Supervisor Support x Decision Latitude/Control**									.30	.01	.005	.014	**.020**	**.16**	**.25**
OCS x TSS x DLC	**Organisational Constraints x Total Social Support x Decision Latitude/Control**									.30	-.01	.003	.014	**.045**	**.11**	**.19**
OCS x SS x DLC	**Organisational Constraints x Supervisor Support x Decision Latitude/Control**									.30	-.01	.003	.014	**.042**	**.11**	**.18**
OCS x CS x DLC	**Organisational Constraints x Co-Worker Support x Decision Latitude/Control**									.30	-.01	.004	.015	**.046**	**.06**	**.09**
INCID x CS x DLC	**Incidents at Work x Co-Worker Support x Decision Latitude/Control**									.31	-.01	.005	.014	**.009**	**.07**	**.14**
Move x SS x DLC	**Organisational Change x Supervisor Support x Decision Latitude/Control**									.30	-.02	.004	.015	**.000**	**.00**	**.14**

± F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

Figure 8.55: Three-Way Interactions with Depersonalisation as Dependent Variable: A. Work Stress Composite x Total Social Support x Decision Latitude/Control; B. Work Stress Composite x Supervisor Support x Decision Latitude/Control; C. Nature of Work x Total Social Support x Decision Latitude/Control; and D. Nature of Work x Supervisor Support x Decision Latitude/Control.

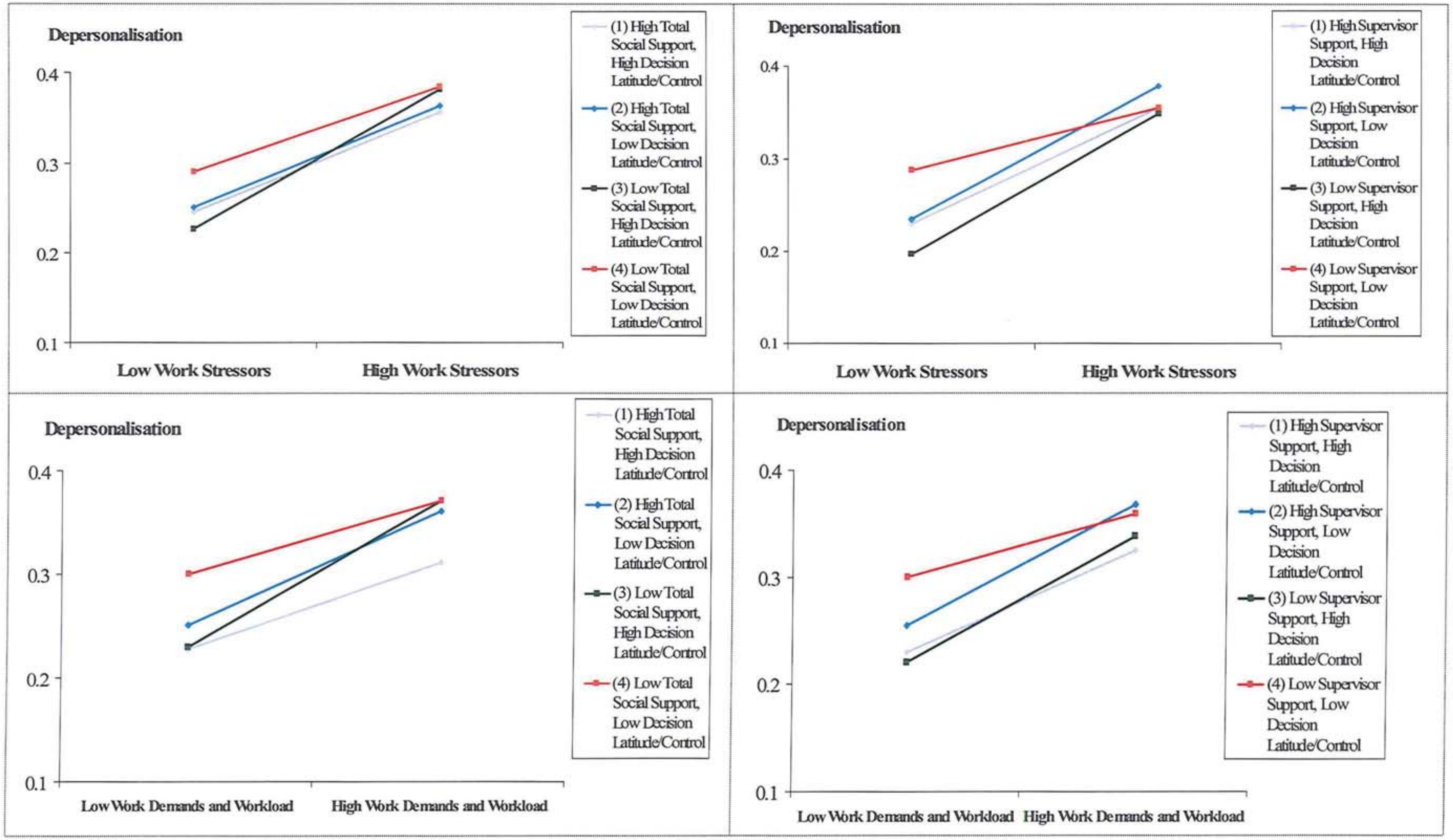


Figure 8.56: Three-Way Interactions with Depersonalisation as Dependent Variable: A. Nature of Work x Co-Worker Support x Decision Latitude/Control. B. Physical Demands x Co-Worker Support x Decision Latitude/Control; C. Quantitative Workload x Supervisor Support x Decision Latitude/Control; D. Organisational Constraints x Total Social Support x Decision Latitude/Control.

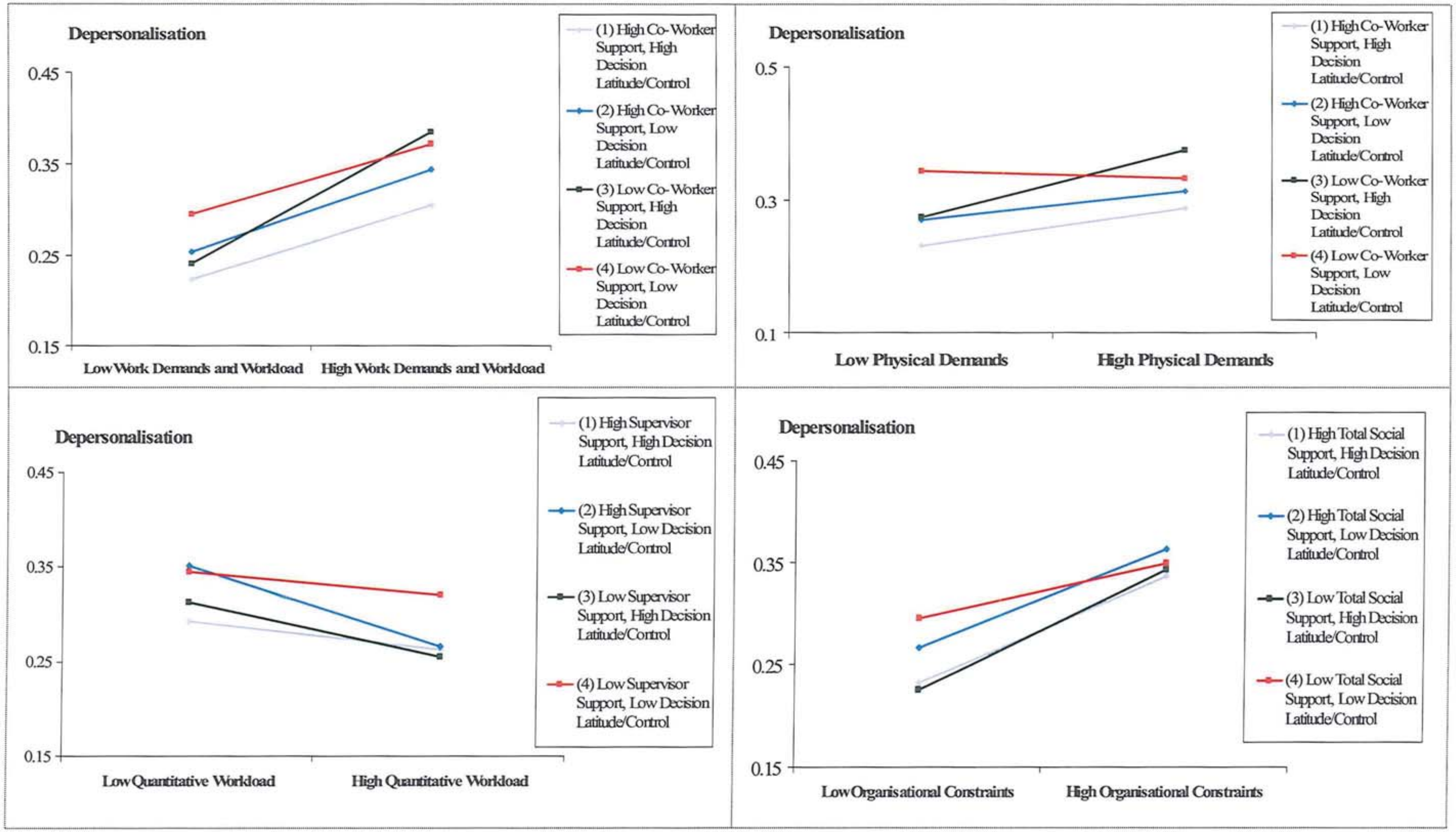


Figure 8.57: Three-Way Interactions with Depersonalisation as Dependent Variable: A. Organisational Constraints x Supervisor Support x Decision Latitude/Control; B. Organisational Constraints x Co-Worker Support x Decision Latitude/Control; C. Incidents at Work x Co-Worker Support x Decision Latitude/Control; D. Organisational Change x Supervisor Support x Decision Latitude/Control

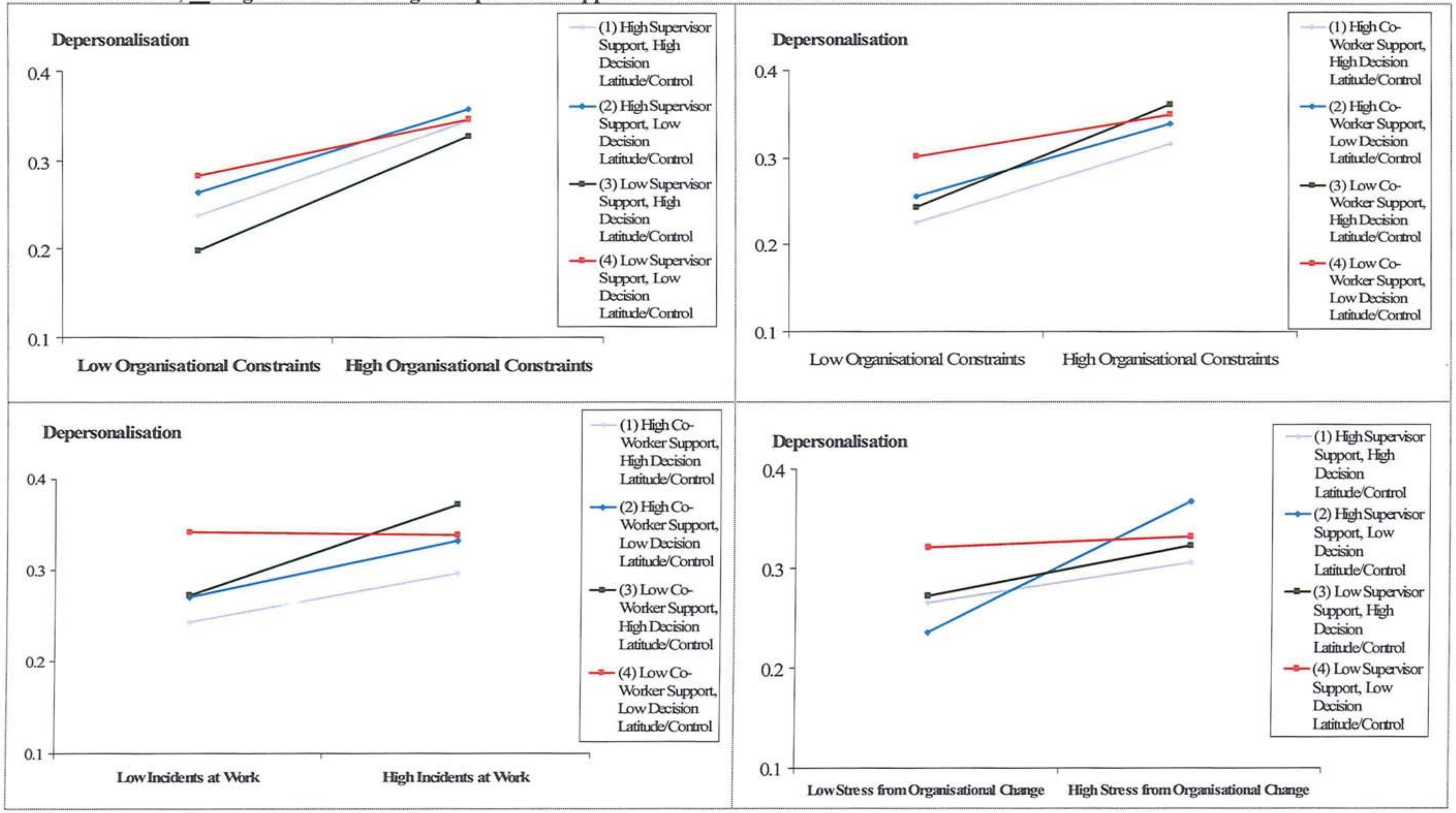


Table 8.29 also shows a number of significant three-way interactions, with mostly medium effect sizes. Twelve graphical presentations of the statistically significant three-way interactions are shown in Figures 8.55, 8.56, and 8.57. In general, the association between the different work stressors and depersonalisation is positive. The exception is quantitative workload, which shows a negative relationship with depersonalisation. These findings are consistent throughout the study. The graphs show several interactions. Graph 8.55(A) shows clear differences between the slopes with the combined higher levels of total social support and DL/C achieving the lowest level of depersonalisation when work stressors are high.

Graph 8.55 (B) also shows clear difference between slopes and three-way interactions. The buffering effect appears at the lower levels of work stressors and is lost with the higher levels. When work stressors are high, combined high supervisor support and low DL/C achieve higher levels of depersonalisation relative to all the other combinations of moderator levels. Graph 8.55(C) shows mainly main effects of the combined higher levels of total social support and DL/C on depersonalisation, across all levels of work demands and workload. The interactions in the graph show when high DL/C interacts with low total social support, the low level of depersonalisation at the lower level of work demands and workload is not maintained when these become high. Figure 8.55(D) shows a clear difference between the slopes showing the combined lower from the combined higher levels of supervisor support and DL/C. The difference between the two linear relationships is greater at the lower level of the stressor than at the higher level. The linear relationships showing the mixed high/low combinations of moderators run parallel to each other, with the one of low supervisor support and high DL/C achieving the lower level of depersonalisation irrespective of the level of the work stressor. The graphs in Figure 8.56 and 8.57 show further three-way interactions. Graph 8.56(A) shows parallel linear relationships, involving the combined higher and the lower levels of co-worker support and DL/C, suggestive of main effects. The graph, however, shows interactions involving the other combinations in the levels of moderator variables. Graph 8.56 (B) in contrast, shows a clear difference between the slopes featuring the combined higher and the lower levels of co-worker support and DL/C. Still, whereas with the lower levels of moderators, the stressor-strain relationship is weakly negative, the one with thc higher levels is weakly positive, suggesting that the buffering effect is more evident before physical demands become high.

Figure 8.56(C) shows a negative association between quantitative workload and depersonalisation for all the linear relationships shown. However, in the presence of the combined higher and the combined lower levels of supervisor support and DL/C, the association between depersonalisation and quantitative workload becomes weakly positive, with the higher levels associated with lower levels of depersonalisation. Graph 8.56(D) shows an interaction between the combined higher and the combined lower levels of total social support and DL/C, with the difference between the two linear relationships greater when organisational constraints are low.

Graphs 8.57(A) and 8.57(B) show similar patterns to 8.56(D), except that the combined low supervisor support and high DL/C in (A) achieve the lowest level of depersonalisation across all levels of organisational constraints. Graphs 8.57(C) and (D) show similar patterns in that there is a weak negative association between depersonalisation and the specifically indicated work stressor with the combined lower levels of support and DL/C. This is in contrast with the positive linear relationships involving the other combinations of moderator variables. There are also clear differences in slopes between the various linear relationships.

In summary, the buffering hypothesis with *depersonalisation* as an outcome variable can be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.29. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. *All* the graphical representations clearly show the interactions involving the two moderator variables, with evident differences in the slopes.

8.3.3.8 Personal Accomplishment as Dependent Variable

Table 8.30 shows a summary of regression analyses including only the statistically significant two- and three-way interactions, with the change in R^2 and F^2 to denote the effect sizes, which vary from medium to large. The significant two-way interactions are co-worker support with incidents at work, and with stress from organisational change. Table 8.30 also shows a number of statistically significant three-way interactions namely, psychological demands x total social support x decision latitude/control; psychological demands x supervisor support x decision latitude/control; physical demands x co-worker support x decision latitude/control; quantitative workload x total social support x decision latitude/control; quantitative workload x supervisor support x decision latitude/control; quantitative workload x co-worker support x decision latitude/control; incidents at work x total social support x decision latitude/control; and incidents at work x supervisor support x decision latitude/control. Figures 8.58, 8.59 and 8.60 provide graphs of the interactions.

Table 8.30:

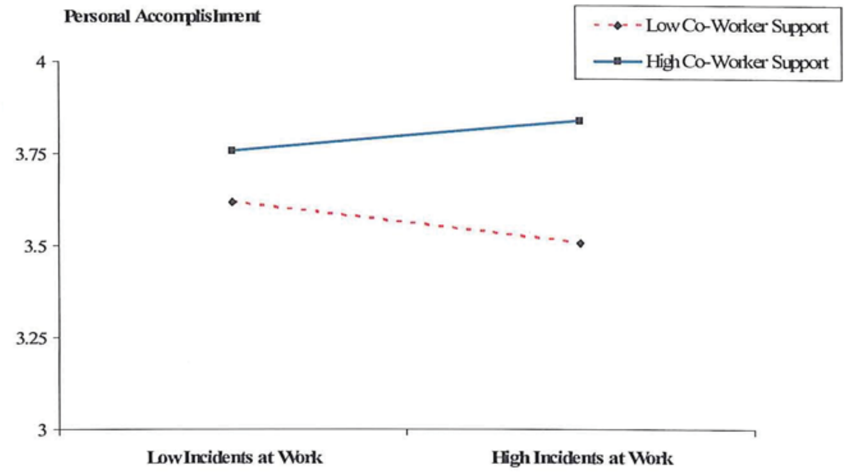
Summary of Regression Analyses Involving Two-Way and Three-Way Interactions Using HLM, for Predicting Personal Accomplishment

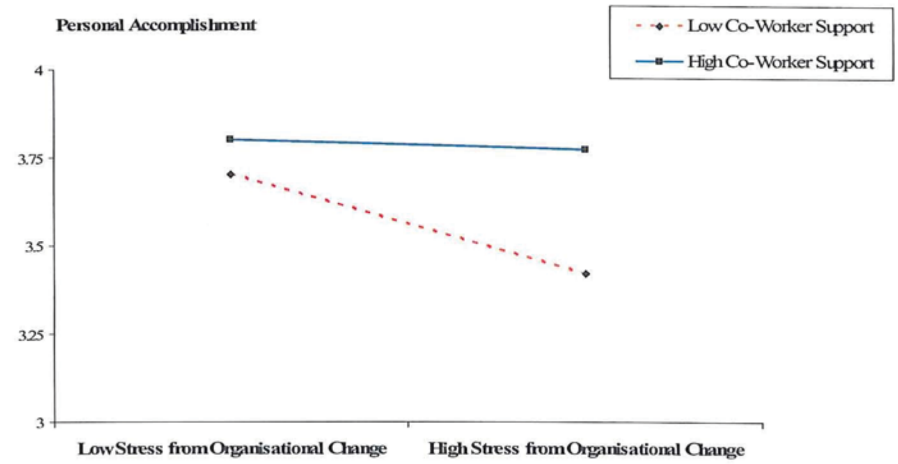
(Only statistically-significant two-way and three-way interactions are listed)

Variable	Model 1: Null			Model 2: Intermediate		Model 3: 2-Way				Model 4: 3-Way				p<.05	ΔR^2	F^2
	γ_{00}	SE	σ^2	γ	SE	γ_{00}	γ_{x0}	SE	σ^2	γ_{00}	γ_{x0}	SE	σ^2			
Outcome Variable																
Depersonalisation	**3.68**	**.03**	**.42**											**.000**		
Model 2: Intermediate Model With All Control Variables																
Constant				(γ_{00}) 3.68	.05									.000		
Age				(γ_{10}) -.03	.04									.358		
Gender				(γ_{20}) -.00	.03									.918		
Marital Status				(γ_{30})- .04	.03									.168		
Employment Contract				(γ_{40}) -.01	.03									.785		
Professional Group				(γ_{50})- .07	.03									.022		
Years Health Care				(γ_{60}) .14	.04									.001		
Years in Unit				(γ_{70}) .04	.03									.244		
Level-2 Unit Size (w_j)				(γ_{01}) -.00	.00									.503		
σ^2 for Model 2				**0.34**												
Two-Way Interaction Models (Model 3) Change in R^2 worked on the difference between two-way interaction model and intermediate model																
INCID x CS **Incidents at Work x Co-Worker Support**						3.68	.05	.03	.30					**.035**	**.08**	**.11**
Move x CS **Stress-Organisational Change x Decision Latitude/Control**						3.67	.06	.02	.29					**.008**	**.10**	**.15**
Three-Way Interaction Models (Model 4) Change in R^2 worked on the difference between three-way interaction model and related two-way interaction																
PSD x TSS x DLC **Psychological Demands x Total Social Support x Decision Latitude/Control**										3.65	-.05	.02	.26	**.002**	**.26**	**.44**
PSD x SS x DLC **Psychological Demands x Supervisor Support x Decision Latitude/Control**										3.65	-.05	.01	.26	**.002**	**.26**	**.44**
PhysD x CS x DLC **Physical Demands x Co-Worker Support x Decision Latitude/Control**										3.66	.04	.02	.25	**.043**	**.25**	**.46**
QWI x TSS x DLC **Quantitative Workload x Total Social Support x Decision Latitude/Control**										3.64	.04	.02	.25	**.016**	**.07**	**.13**
QWI x SS x DLC **Quantitative Workload x Supervisor Support x Decision Latitude/Control**										3.64	.06	.02	.25	**.002**	**.07**	**.13**
QWI x CS x DLC **Quantitative Workload x Co-Worker Support x Decision Latitude/Control**										3.65	.04	.02	.25	**.027**	**.07**	**.13**
INCID x TSS x DLC **Incidents at Work x Total Social Support x Decision Latitude/Control**										3.67	.07	.02	.24	**.002**	**.07**	**.13**
INCID x SS x DLC **Incidents at Work x Supervisor Support x Decision Latitude/Control**										3.68	.08	.02	.24	**.001**	**.07**	**.13**

± F^2 (Cohen, 1988): 0.02= small effect size; 0.15= medium effect size; 0.35= large effect size. γ_{00}= Intercept; γ_{x0}= Slope; γ_{01}= Difference between (w_j) intercepts.

Figure 8.58
Two-Way Interactions: A. Incidents at Work x Co-Worker Support, and B. Stress from Proposed Move to New Hospital x Co-Worker Support with Personal Accomplishment as Dependent Variable





The graphs in Figure 8.58 are the statistically significant two-way interactions with medium-size effects. In both graphs, there is a negative association between the independent and dependent variables, when co-worker support is low. However, in the first graph, the presence of high co-worker support results in the positive association between incidents at work and personal accomplishment. This relationship may be explained by having employees capitalising on the learning experience from incidents at work, provided there is adequate support from peers. In the second graph, there is no association between the independent and dependent variables. Therefore, co-worker support appears to act as a buffer in both situations.

Figure 8.59: Three-Way Interactions with Personal Accomplishment as Dependent Variable: A. Psychological Demands x Total Social Support x Decision Latitude/Control; B. Psychological Demands x Supervisor Support x Decision Latitude/Control; C. Physical Demands x Co-Worker Support x Decision Latitude/Control; D. Quantitative Workload x Total Social Support x Decision Latitude/Control

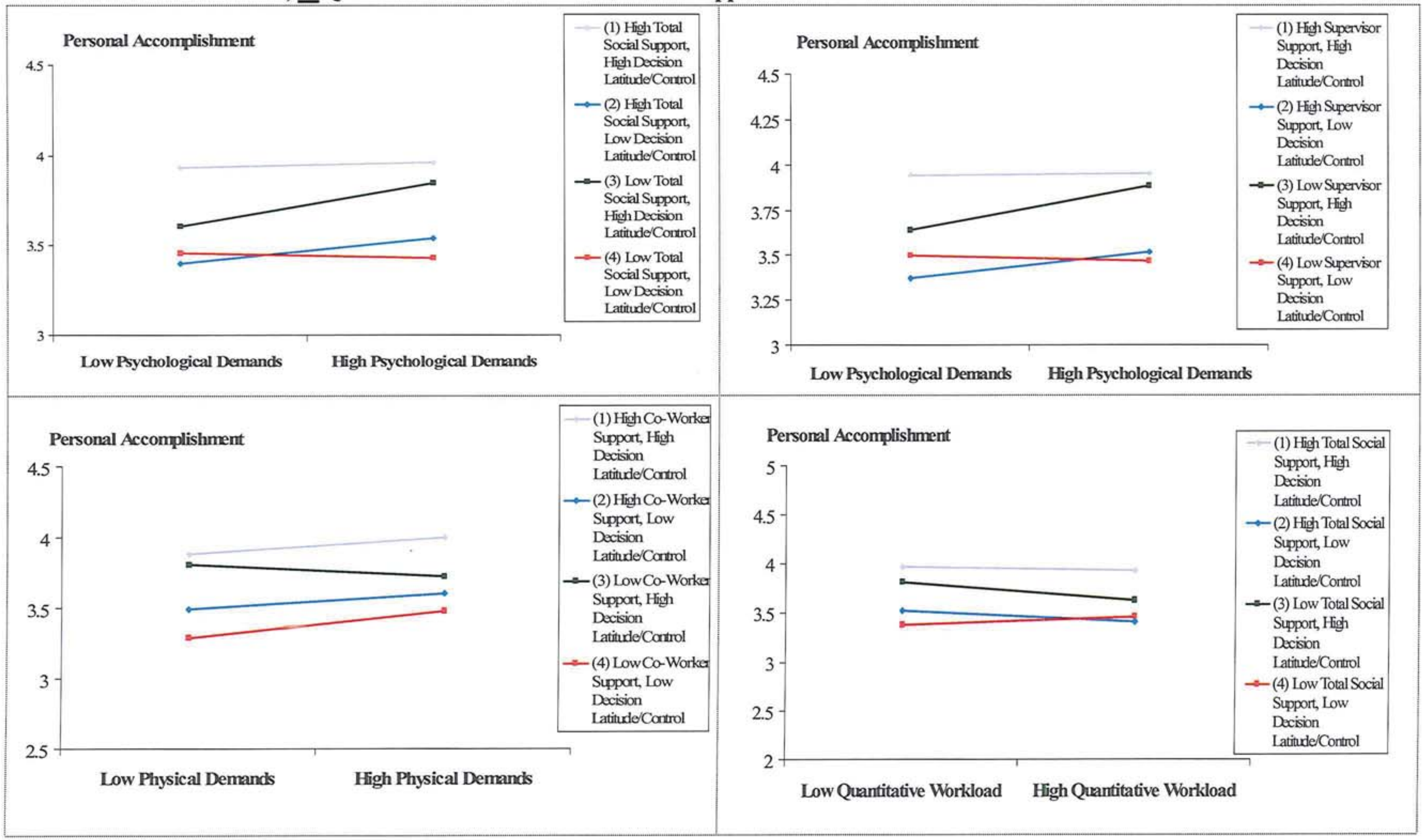
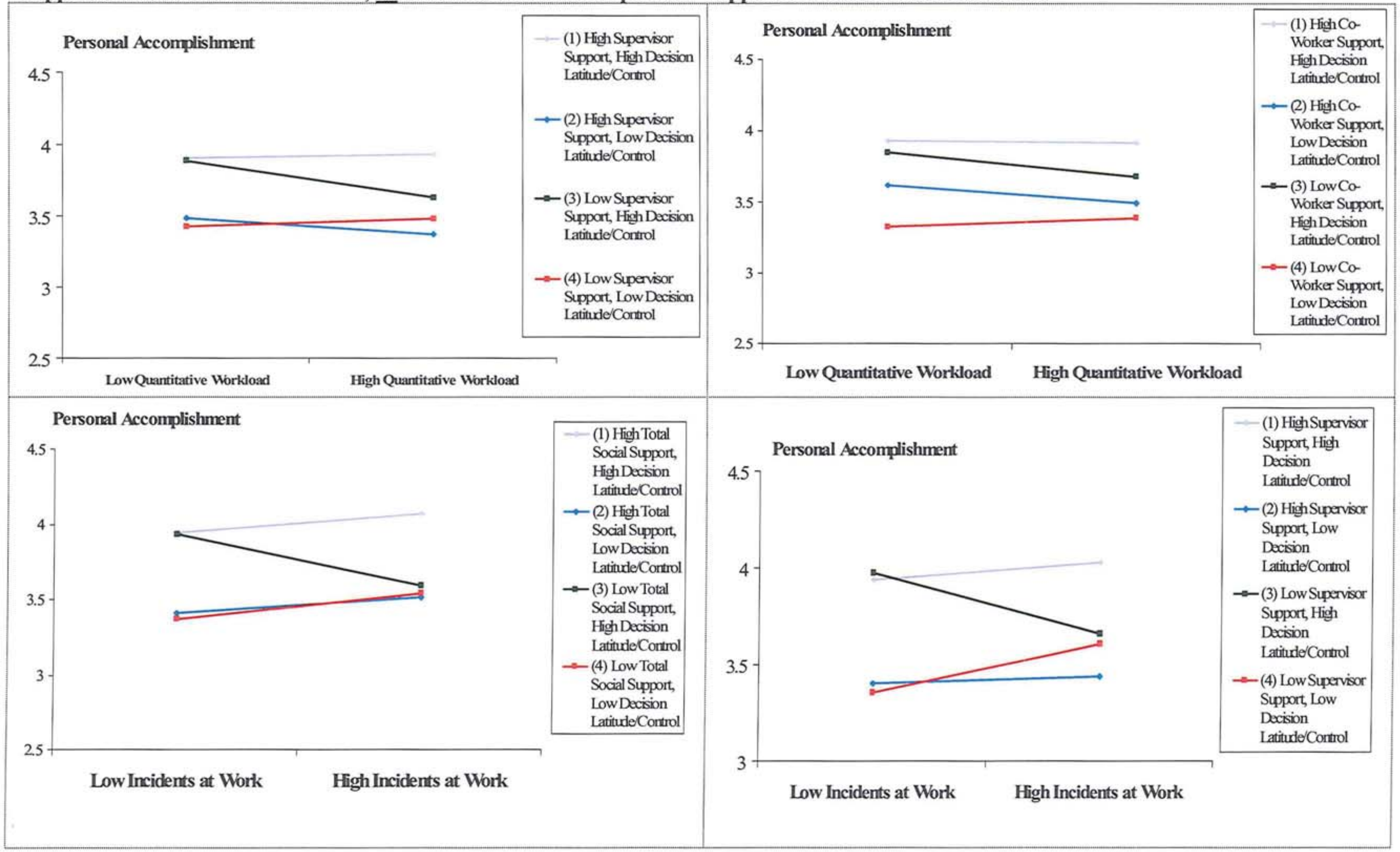


Figure 8.60: Three-Way Interactions with Personal Accomplishment as Dependent Variable: A. Quantitative Workload x Supervisor Support x Decision Latitude/Control; B. Quantitative Workload x Co-Worker Support x Decision Latitude/Control; C. Incidents at Work x Total Social Support x Decision Latitude/Control; D. Incidents at Work x Supervisor Support x Decision Latitude/Control



The graphs in Figure 8.59 show that personal accomplishment is lowest with low psychological demands high social support and low DL/C; and with low physical/low quantitative workload and low total social support and DL/C. Conversely, across the four graphs in Figure 8.59, personal accomplishment is highest with higher levels of moderator variables but is not affected by level of stressor. The linear relationships involving the combined higher and combined lower levels of support and DL/C are in parallel to each other, and show no relationship between work stressor and strain. Furthermore, there is a slight negative relationship of personal accomplishment with physical demands/quantitative workload in the presence of low co-worker support and high DL/C; and with quantitative workload in the presence of high social support and low DL/C.

The graphs in Figure 8.60 also show negative associations between personal accomplishment and work stressors (quantitative workload – not consistent with previous results, and incidents at work) in the presence of different sources of social support and high DL/C. Personal accomplishment is lowest with lower levels of moderator variables; and highest with higher levels of moderator variables, largely irrespective of the level of work stressors. Additionally, it appears that high DL/C lowered the perceptions of the respondents' personal accomplishment when quantitative workload and incidents at work were high, in the presence of low supervisor/co-worker support.

In summary, the buffering hypothesis with *personal accomplishment* as an outcome variable can also be *accepted* for a number of work stressor-to-strain relationships, as specified in Table 8.30. There are a number of significant two-way and three-way interactions involving social support and decision latitude/control as moderators. Some of the graphical representations show the interactions involving the two moderator variables, with evident differences in the slopes.

Summary of Findings on Hypotheses Group Three

Therefore, **hypothesis 3a**, namely that social support will moderate the relationships between work stressors, and psychological/physiological strains, such that higher levels of social support will minimise (buffer) these relationships, is **partially supported** in that some not all the two-way interactions were found to be statistically significant. The results are as expected and in line with published literature. However, only nine out of forty two-way interactions tested were statistically significant at $p<0.05$. Indeed, McClelland and Judd (1993) noted that although interaction effects are frequently found in experimental studies, field researchers report considerable difficulty in finding theorized moderator effects. The authors cited responsible factors as being measurement error and use of nonlinear scales and claimed that tests of interactions in field studies will often have less than 20% of the efficiency of optimal experimental tests.

The two-way interactions involving the composite scores namely, total social support x composite work stressors and total social support x nature of work were not statistically significant. Hence my decision to go for further and more specific analyses primarily with composite psychological strains as outcome variable. These included interactions between specific work stressors and total social support, or specifically supervisor or co-worker support, which were found to be statistically significant. Similarly, several statistically significant two-way interactions were found with physiological strains as outcome variable, as well as with specific individual indicators of psychological strains namely, job satisfaction, intention to leave job, composite burnout score, and its three dimensions (emotional exhaustion, depersonalisation and personal accomplishment). Those found to be statistically significant have been illustrated in the preceding subsections, and are in line with published literature.

Similarly, **hypothesis 3b**, namely that decision latitude/control will moderate the relationships between work stressors, and psychological/physiological strains, such that higher levels of decision latitude/control will minimise (buffer) these relationships, **partially supported** in that only a few of the two-way interactions were found to be statistically significant. As when testing hypothesis 3a, the two-way interactions involving the composite scores namely, decision latitude/control x composite work stressors and decision latitude/control x nature of work were not statistically significant, hence my decision to go for further and more specific analyses.

Primarily, the composite psychological strains were tested, but further analyses also included specific indicators of psychological strain as outcome variables. With composite psychological strain, the only significant two-way interaction with DL/C involved interpersonal conflict at work as the specific work stressor. The two-way interaction psychological demands x DL/C was not statistically significant and therefore this study did not support Karasek's DC model. There were no significant two-way interactions with physiological strain as outcome variable. The other significant two-way interactions have been illustrated in previous subsections.

The results also show a number of significant three-way interactions, in that **hypothesis 3c** is **partially supported**. For the composite psychological strains, two significant three-way interactions include: composite work stressors x supervisor support x DL/C and nature of work x total social support x DL/C. These findings support the DC/S model, even though the three-way interaction that specifically included psychological demands x total social support x DL/C was not statistically significant. For physiological strains, the two significant three-way interactions that involve composite work stressors include: nature of work x supervisor support x DL/C and nature of work x co-worker support x DL/C. Other significant three-way interactions with specific work stressors and strains were tested and illustrated in previous subsections in this section. In conclusion, the third group of hypotheses were supported, with some two-way and three-way interactions confirming previous studies mostly within the interactional stress theories, as critically appraised in chapter two.

Moreover, this study also revealed significant two-way and three-way interactions, unique to this study which contributes further knowledge to the buffering hypothesis in the occupational stress literature. For example, with psychological strains as outcome variable, all forms of social support and DL/C buffer hospital employees from interpersonal conflict at work, whereas three-way interactions involving social support and decision latitude/control, appear to buffer hospital employees, from organisational constraints and stress due to major organisational change. Similar new findings were found with the other outcome variables, namely indicators of psychological strains, as illustrated in this section. However, it is beyond the scope of this thesis to delve deeper into each specific interaction, which were tested as a first step prior to future longitudinal research, in which I would be able to validate the newer findings and throw more light on the direction of paths in the hypothesised models within the conceptual framework.

8.3.4 Hypotheses Group Four: The Relationship between Unit-level Measures of Transformational Leadership and Team Climate, and Externally-Rated Unit-level Performance in Hospital Practice

The final group of hypotheses deals with variables that are all at one-level namely, at the higher- or hospital-unit level. Indeed, both transformational leadership and team climate achieved acceptable level of indices to justify aggregation to unit level, as discussed in chapter seven. On the other hand, unit performance is already at hospital unit-level, and includes scores by external raters.

Therefore, analysis can be conducted by means of standard multiple regressions using SPSS version 14.0. As noted earlier, this group of hypotheses overcomes common source bias by having the collection of data on transformational leadership/team climate from a different source to that of unit performance.

The first two hypotheses in the fourth group are:

Hypothesis 4a:

> Unit-level transformational leadership is positively associated with externally-rated unit-level performance in hospital practice.

Hypothesis 4b:

> Unit-level team climate is positively associated with externally-rated unit-level performance in hospital practice.

Regression analysis was performed between unit performance as the dependent variable and transformational leadership (Tables 8.31 and 8.32) and team climate (Table 8.34 a and b, p.398) as the independent variables, while controlling for unit size – a global construct, in both situations. Analysis was performed using SPSS

REGRESSION and SPSS FREQUENCIES, version 14.0, for evaluation of assumptions.

For transformational leadership, Table 8.32a (next page) displays the correlations between the variables, the unstandardized regression coefficients (B), and intercept, the standardized regression coefficients (β), the collinearity statistics, t-ratio, and the level of significance. The assumptions for multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were not violated. Regression for transformational leadership was not significantly different from zero at $p<.05$ ($p=0.088$). Table 8.32b (p.393) shows an R^2 change of 0.023 after controlling for unit size, and correcting for rater bias as discussed in chapter seven. This result is not as expected and indeed, not in line with published literature, including two meta-analyses (DeGroot, Kiker, & Cross, 2000; Lowe, Kroeck, & Sivasubramaniam, 1996) and two experimental studies (Barling, Weber, & Kelloway, 1996; Bass, Avolio, Jung, & Berson, 2003) that strongly linked transformational leadership with performance and effectiveness at both higher-level, as well as at individual level. Therefore **hypothesis 4a** is **not supported**.

Table 8.31
Sequential Regression Analysis for Transformational Leadership Predicting Hospital Unit Performance (N=136)

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	β			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.824	.080		35.453	.000	2.667	2.982					
	Unit Size	.000	.004	.009	.100	.920	-.008	.009	.009	.009	.009	1.000	1.000
2	(Constant)	2.284	.324		7.045	.000	1.643	2.926					
	Unit Size	.002	.004	.038	.427	.670	-.007	.010	.009	.038	.038	.964	1.038
	Unit Level Transformational Leadership	.171	.099	.154	1.718	.088	-.026	.368	.147	.151	.151	.964	1.038

(a) Dependent Variable: Unit Performance

Table 8.32
Model Summary of Hierarchical Regression Analysis for Transformational Leadership Predicting Hospital Unit Performance (N=136)

Model Summary (c)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.009(a)	.000	-.008	.56239	.000	.010	1	127	.920
2	.152(b)	.023	.007	.55812	.023	2.950	1	126	.088

(a) Predictors: (Constant), Unit Size
(b) Predictors: (Constant), Unit Size, Unit Level Transformational Leadership
(c) Dependent Variable: Unit Performance

Bass (1985) argued in favour of the flexibility and adaptability of transformational leadership in energising groups to persist particularly in the presence of unpredictable conditions and opposition forces that create a stressful environment. However, none of the studies published included hospitals as research context. Indeed, the research contexts selected by the pioneers in the transformational leadership literature included the US military (Bass, Avolio, et al., 2003), salespersons (MacKenzie & Podsakoff, 2001), and Australian Public Service (Rafferty & Griffin, 2004; 2006).

However, sequential regression was employed to determine if any of the aggregated unit-level sub-dimensions of transformational leadership predicted unit performance, after controlling for unit size. From all the five sub-dimensions, *vision* showed a significant regression with an R^2 change of 0.044 at p=0.017, as shown in Tables 8.33a and 8.33b (overleaf). This means that 4.4% of the hospital unit performance was predicted by knowing the aggregated score of the transformational leadership's vision.

This result is as expected and in line with published literature. Vision's prediction on unit performance may be explained by the transformational leader's effect on followers when articulating a vision, namely in expanding people's awareness of the possibilities inherent in their environment (Bass, Avolio, Jung, & Berson, 2003), thereby unleashing their full potential to capitalize on every opportunity. In conclusion, although this study did not show a statistically significant regression of unit performance on transformational leadership, one of its key sub-dimensions was found to be a significant predictor. Therefore, this result calls for further longitudinal analysis of the same sample at different time points, not only to recheck prediction but also to throw some light on the direction of causality.

Table 8.33a: Sequential Regression Analysis for the Dimensions of Transformational Leadership Predicting Hospital Unit Performance (N=136)

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.824	.080		35.453	.000	2.667	2.982					
	Unit Size	.000	.004	.009	.100	.920	-.008	.009	.009	.009	.009	1.000	1.000
2	(Constant)	2.114	.304		6.946	.000	1.512	2.717					
	Unit Size	.002	.004	.047	.534	.594	-.006	.011	.009	.048	.047	.968	1.033
	Unit Level VIS	.213	.088	.214	2.413	.017	.038	.387	.205	.210	.210	.968	1.033
3	(Constant)	2.098	.307		6.825	.000	1.489	2.706					
	Unit Size	.002	.004	.050	.564	.574	-.006	.011	.009	.050	.049	.963	1.038
	Unit Level VIS	.160	.142	.161	1.126	.262	-.121	.441	.205	.100	.098	.374	2.674
	Unit Level IC	.060	.128	.067	.472	.638	-.193	.314	.185	.042	.041	.373	2.678
4	(Constant)	2.155	.342		6.301	.000	1.478	2.832					
	Unit Size	.002	.004	.051	.571	.569	-.006	.011	.009	.051	.050	.962	1.039
	Unit Level VIS	.177	.149	.178	1.186	.238	-.118	.472	.205	.106	.104	.342	2.928
	Unit Level IC	.080	.138	.090	.581	.562	-.194	.354	.185	.052	.051	.321	3.115
	Unit level IS	-.059	.151	-.050	-.386	.700	-.358	.241	.129	-.035	-.034	.453	2.207
5	(Constant)	2.260	.348		6.496	.000	1.571	2.949					
	Unit Size	.002	.004	.034	.381	.704	-.007	.010	.009	.034	.033	.947	1.056
	Unit Level VIS	.180	.149	.181	1.209	.229	-.114	.474	.205	.108	.105	.342	2.928
	Unit Level IC	.217	.166	.242	1.303	.195	-.112	.546	.185	.117	.114	.221	4.530
	Unit level IS	-.037	.151	-.031	-.242	.809	-.336	.263	.129	-.022	-.021	.449	2.229
	Unit Level SL	-.195	.133	-.214	-1.466	.145	-.458	.068	.068	-.131	-.128	.356	2.810
6	(Constant)	2.325	.350		6.634	.000	1.631	3.019					
	Unit Size	.002	.004	.045	.499	.619	-.006	.011	.009	.045	.043	.939	1.065
	Unit Level VIS	.204	.149	.205	1.365	.175	-.092	.499	.205	.123	.119	.336	2.974
	Unit Level IC	.284	.174	.318	1.636	.104	-.060	.628	.185	.147	.142	.201	4.974
	Unit level IS	-.025	.151	-.022	-.165	.869	-.324	.274	.129	-.015	-.014	.447	2.237
	Unit Level SL	-.123	.144	-.135	-.855	.394	-.407	.161	.068	-.077	-.074	.303	3.299
	Unit Level PR	-.200	.153	-.205	-1.302	.195	-.503	.104	.063	-.117	-.113	.305	3.279

(a) Dependent Variable: Unit Performance

Table 8.33b: Model Summary of Sequential Regression Analysis for the Dimensions of Transformational Leadership Predicting Hospital Unit Performance (N=136)

Model Summary (g)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.009(a)	.000	-.008	.56239	.000	.010	1	127	.920
2	.210(b)	.044	.029	.55200	.044	5.825	1	126	.017
3	.214(c)	.046	.023	.55371	.002	.223	1	125	.638
4	.217(d)	.047	.016	.55560	.001	.149	1	124	.700
5	.252(e)	.063	.025	.55305	.016	2.149	1	123	.145
6	.276(f)	.076	.031	.55149	.013	1.696	1	122	.195

(a) Predictors: (Constant), Unit Size
(b) Predictors: (Constant), Unit Size, Unit Level Vision
(c) Predictors: (Constant), Unit Size, Unit Level Vision, Unit Level Inspirational Communication
(d) Predictors: (Constant), Unit Size, Unit Level Vision, Unit Level Inspirational Communication, Unit level Intellectual Stimulation
(e) Predictors: (Constant), Unit Size, Unit Level Vision, Unit Level Inspirational Communication, Unit level Intellectual Stimulation, Unit Level Supportive Leadership
(f) Predictors: (Constant), Unit Size, Unit Level Vision, Unit Level Inspirational Communication, Unit level Intellectual Stimulation, Unit Level Supportive Leadership, Unit Level Personal Recognition
(g) Dependent Variable: Unit Performance

Tables 8.34a and 8.34b (overleaf) show that regression for team climate was significantly different from zero at $p<.05$ (p=0.012), with an R^2 change of 0.049, after controlling for unit size, and correcting for rater bias as discussed in chapter seven. This means that 4.9% of the hospital unit performance was predicted by knowing the scores of the unit's aggregated score of team climate.

Therefore **hypothesis 4b is supported**. This result is as expected, and in line with research conducted by the Aston Research Group on British NHS teams in finding lower mortality rates for hospitals having well-functioning teams (West et al., 2002). Other studies linked well-functioning teams with better quality of patient care (Walburg et al., 2006; West, 2002).

Table 8.34a
Sequential Regression Analysis for Team Climate Predicting Hospital Unit Performance (N=136)

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.824	.080		35.453	.000	2.667	2.982					
	Unit Size	.000	.004	.009	.100	.920	-.008	.009	.009	.009	.009	1.000	1.000
2	(Constant)	2.820	.078		36.159	.000	2.666	2.975					
	Unit Size	.001	.004	.014	.164	.870	-.008	.009	.009	.015	.014	.999	1.001
	Unit Level Team Climate	.220	.086	.222	2.560	.012	.050	.390	.222	.222	.222	.999	1.001

(a) Dependent Variable: Unit Performance

Table 8.34b
Model Summary of Hierarchical Regression Analysis for Team Climate Predicting Hospital Unit Performance (N=136)

Model Summary(c)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.009(a)	.000	-.008	.56239	.000	.010	1	127	.920
2	.222(b)	.049	.034	.55048	.049	6.551	1	126	.012

(a) Predictors: (Constant), Unit Size
(b) Predictors: (Constant), Unit Size, Unit Level Team Climate
(c) Dependent Variable: Unit Performance

The next hypothesis aims to test the prediction of unit performance by the social environment as characterised by both transformational leadership and team climate.

Hypothesis 4c (*Not indicated in the illustration Figure 8.63)*:

A positive social environment, characterised by higher levels of both unit-level measures of transformational leadership and team climate, is associated with higher externally-rated unit-level performance in hospital practice.

Regression analysis was performed, and after controlling for unit size, the aggregated unit-level transformational leadership and team climate (Table 8.35a, p.400) were entered into the equation. Regression was significantly different from zero, F change (2, 125) = 3.361, p=0.038, with an R^2 change of 0.051, as shown in Tables 8.35b.

Therefore **hypothesis 4c** is **supported**. Indeed, 5.1% of the hospital unit performance was predicted by knowing the scores of the social environment's transformational leadership and team climate. Therefore, the model that was tested in hypothesis 4c took into consideration both elements, namely transformational leadership and team climate, which as I argued in chapter three, shape the hospital units' quality of social environment.

In summary, despite rejecting hypothesis 4a, namely that the prediction of hospital unit performance from the composite score for transformational leadership alone was not statistically significant, hypothesis 4c provided a statistically significant model that considered transformational leadership together with team climate in predicting performance.

Table 8.35a

Hierarchical Multiple Regression Analysis for Both Transformational Leadership and Team Climate in Predicting Hospital Unit Performance (N=136)

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.824	.080		35.453	.000	2.667	2.982					
	Unit Size	.000	.004	.009	.100	.920	-.008	.009	.009	.009	.009	1.000	1.000
2	(Constant)	2.652	.373		7.103	.000	1.913	3.391					
	Unit Size	.001	.004	.023	.256	.799	-.007	.010	.009	.023	.022	.956	1.046
	Unit Level Team Climate	.195	.101	.197	1.926	.056	-.005	.396	.222	.170	.168	.722	1.386
	Unit Level Transformational Leadership	.053	.116	.048	.460	.646	-.176	.282	.147	.041	.040	.696	1.437

(a) Dependent Variable: Unit Performance

Table 8.35b: Model Summary of Hierarchical Multiple Regression Analysis for the Dimensions of Transformational Leadership Predicting Hospital Unit Performance (N=136)

Model Summary(c)

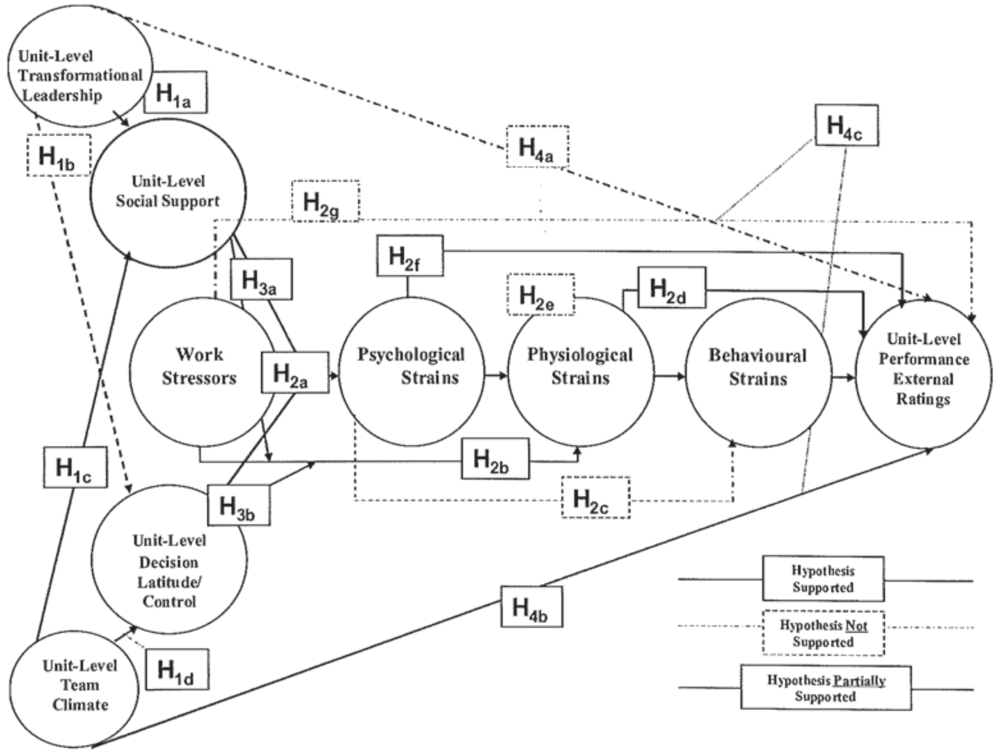
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.009(a)	.000	-.008	.56239	.000	.010	1	127	.920
2	.226(b)	.051	.028	.55221	.051	3.361	2	125	.038

(a) Predictors: (Constant), Unit Size
(b) Predictors: (Constant), Unit Size, Unit Level Team Climate, Unit Level Transformational Leadership
(c) Dependent Variable: Unit Performance

8.4 Chapter Summary

Chapter eight provided the results of the four groups of testable hypotheses, as part of study two. Figure 8.61 illustrates the various hypotheses labelled as supported (Hypotheses 1a, 1c, 1d, 2a, 2b, 2d, 2f, 4b, and 4c); partially supported (hypotheses 3a, 3b, and 3c) and not supported (hypotheses 1b, 2c, 2e, 2g, and 4a).

Figure 8.61: Supported, Partially Supported, and Unsupported Hypotheses in the Conceptual Framework of Study Two.



However, a closer look at Figure 8.64 shows that the paths linking one end to the other in the conceptual framework were found to be statistically significant and therefore, apart from making theoretical sense, the proposed framework appears to make empirical sense as well. However, I cannot infer the direction of causality since study two is a cross-sectional study. In the next chapter, I will discuss the findings and address the limitations of study two.

CHAPTER NINE

STUDY TWO
DISCUSSION

9.1 Chapter Summary

The aim of this chapter is to discuss the key findings of study two while addressing its limitations. The next section provides a summary of the main findings of the tested hypothesised relationships.

9.2 Summary of Main Findings

It was the major aim of this thesis across the two studies to examine the buffering effects of social support and decision latitude/control on several work stressor-to-strain relationships. However, the aims specific to study two were:

1. To examine unit-level measures of transformational leadership and team climate, associated with unit-level climate for social support and decision latitude/control across hospital units, which led to the formulation of **hypotheses group one**.

This investigation warranted multilevel analyses and involved testing several intercept-as-outcome models. The results provided support for the prediction of unit –level climate for social support by both unit-level transformational leadership and team climate, both separately and together. This is in line with the empirical work by Rafferty and Griffin (2004) for transformational leadership and by Borrill et al. (2001) for well-functioning hospital teams.

The results also supported the yet unexplored prediction of init-level climate for decision latitude/control by unit-level team climate, and therefore, confirmed the theoretical reasoning behind this conceptual link.

However, the results provided no support for the main effect model that proposed the existence of a direct relationship between transformational leadership and decision latitude/control. This is not as expected, since all the characteristics of the five sub-dimensions of transformational leadership, which is to say vision, intellectual stimulation, inspirational communication, supportive leadership, and personal recognition are known to influence individual as well as group performance.

I will argue that performance depends on the extent to which hospital unit members of staff are allowed to utilise their skills and to assume their authority in decision-making. On the other hand, the findings of this study fully supported the earlier research on team climate. Based on its four sub-dimensions, namely level of participation within team, clarity of team objectives, support for innovation, and adoption of team task style, team climate is associated with higher levels of support, shared decision-making, less perceived stress, and better performance.

2. To examine the associations between hospital employees' work stressor-to-strain relationships associated with externally-rated unit-level measure of performance, which led to the formulation of hypotheses group two.

Although the level of analysis was intended at the lower level as far as the work stressor-to-strain relationships are concerned, a clustering effect due to hospital employees being nested within units was noticed from the indices of within-group agreement $R_{wg\,(j)}$ and intra-class correlations. This clustering effect is suggestive of shared variance. Traditional statistical techniques using ordinary least squares estimation would have violated the assumptions of independence of observations and homoscedasticity, thereby rendering the results inaccurate. Therefore, hypotheses group two still entailed the use of multilevel techniques, with the relationships, however, modelled at level-one, and controlled for unit size at level-two. Apart from the main effects, this group of hypothesis involved testing a number of mediated relationships and analysed by means of multilevel structural equation modelling.

The results primarily showed statistically significant main effects of hospital employees' perceived work stressors on both their psychological and physiological strains. Additionally, statistically significant and partially mediated relationships linked work stressors, perceived by hospital employees nested within hospital units, with performance of these hospital units, as rated by a group of external raters. These findings expand Karasek's DC/S model (Karasek & Theorell, 1990) in two ways. At the first instance, it focuses on adopting a multilevel perspective of the DC/S model. Secondly, this model specifically identifies psychological demands as a precursor to psychological strains, whereas this study explored other related relationships. On the other hand, the JD-R model (Schaufeli & Bakker, 2004) is less specific on the nature of work demands, and indeed, it identifies both the physical and psychological aspects of job demands as potential stressors. Similarly, other authors (Gray-Toft & Anderson, 1981; Spector & Jex, 1998) identified relationships of the quantitative and qualitative nature of work with various indicators of strains.

The results of the partially mediated relationships are also as expected, and in line with the empirical evidence provided in two separate studies by de Jonge et al. (1996), and Schaufeli, and Bakker (2004) in that emotional exhaustion (1996) and burnout (2004) mediated the relationships between job demands and health complaints.

The full path model, namely work stressors-to-strains-to-performance, has not yet been explored in published literature. Therefore, the results contribute to new knowledge. Psychological and physiological conditions of hospital unit members of staff appear to have an impact on how they behave, not only by absenting themselves from work, but also by the level of group performance achieved by their unit.

3. To examine social support and decision latitude/control as moderators of the work stressor-to-strain relationships , which led to the formulation of **hypotheses group three**. The hypothesised relationships involved a series of two-way and three-way interactions whose intent was to test the moderation hypotheses by means of random coefficient regression models.

Indeed within **hypothesis 3a**, a number of two-way interactions that involved social support (total, supervisor, and co-worker) and the work stressors (composite scores and specific work stressors) were tested. Forty-five, two-way interactions, out of the two hundred and forty tested, were found to be statistically significant. This is as expected, and in line with the claim by McClelland and Judd (1993), who noted that field researchers report considerable difficulty in finding theorized moderator effects. Therefore, one is justified in arguing that the results of this study provide substantial evidence of the buffering effects by social support in the form of supervisor and co-worker support.

Similarly for **hypothesis 3b**, a number of two-way interactions that involved decision latitude/control and work stressors (composite scores and specific work stressors) were tested. Only six, out of eighty two-way interactions, were found to be statistically significant. The buffering effect of decision latitude/control is thus very limited, and indeed, specific to the type of work stressor. For example, the results showed a buffering effect for hospital employees who developed less psychological strain and emotional exhaustion, when faced with interpersonal conflict and with stress secondary to a major organisational change.

Moreover, psychological demands and physical demands interacted significantly with decision latitude/control in buffering employees from the perceptions of burnout and specifically depersonalisation. These findings replicated the theoretical and empirical findings linking Karasek's DC Model (1979) and burnout (Maslach, Schaufeli, & Leiter, 2001).

With regard to **hypothesis 3c**, social support and decision latitude/control interacted with work stressors in a series of three-way interactions. The results not only confirmed Karasek's DC/S model but also contributed to further knowledge in the buffering hypothesis of a variety of specific work stressor-to-strain relationships facing unit members on a day-to-day basis. Out of the two hundred and forty three-way interactions that were tested, fifty-two were found to be statistically significant. As I pointed out in chapter eight, I first looked at the macro picture that included composite scores of work stressors, nature of work, psychological strains, total social support, and burnout in various models that were tested. I then focused on specific dimensions to get a better understanding of the buffering hypotheses.

The results of study two, therefore, provided substantial evidence that the interactions of both social support and decision latitude/control with the various work stressors may buffer hospital employees from developing strains. In conclusion, although several of the three-way interactions were not statistically significant, those that were have generated substantial interest as to potentially influence policymaking and make recommendations for future research.

4. To examine the relationships between unit-level measures of transformational leadership and team climate, and externally-rated unit-level performance in hospital practice which led to the formulation of **hypotheses group four.**

The final group of hypothesis tested the relationships between the constructs that were intended at the single but higher level of analysis, thereby justifying the use of standard multiple regression. Unit-level team climate predicted unit-level performance, with an R square change of 0.049, after controlling for unit size. This is in line with empirical evidence provided by Borrill et al. (2001) and West et el. (2002).

However, the results did not support the association between unit-level transformational leadership and unit-level performance. This is *definitely not in line* with empirical evidence linking transformational leadership and performance primarily in two meta-analyses by DeGroot et al. (2000) and Lowe et al. (1996). In specific studies, transformational leadership was empirically linked with financial performance by financial managers (Barling et al., 1996); performance by units in US Army platoons (Bass et al., 2003); and sales performance by sales agents in a large insurance company (Mackenzie & Podsakoff, 2001). Having said this, to my knowledge, none of the published studies linking transformational leadership and performance were conducted within hospitals. Therefore, further studies need to be carried out to clarify the conceptual link within this context.

Despite the fact that the sample size in this phase of analysis was only one hundred thirty-six, namely that of the hospital units under study, the results still provided substantial evidence of the prediction of hospital unit-level performance by the aggregated scores of transformational leadership and team climate when entered in the same model (Hypothesis 4c). Indeed, after having controlled for unit size, the change in R squared was that of 0.051. However, this statistically significant result appeared to be attributed mainly to the strong contribution by team climate. On further analysis, out of the five sub dimensions for unit-level transformational leadership, only *vision* significantly predicted hospital unit-level performance, with an R square change of 0.044. Hypotheses group four consolidates the findings of the other groups of hypotheses and firmly confirms the conceptual framework as a series of group-level models. This perspective should stimulate theorists and practitioners alike to focus on the implications across units rather than across the whole organisation.

In summary, although not all the tested hypothesised relationships were accepted, study two showed interesting results on most of the conceptual links between the variables under study. This should solidly lay the ground for future multilevel longitudinal research that would establish the direction of causality with greater confidence.

9.3 Study Limitations and Strengths

A criticism that may be levelled at this thesis is that the conceptual framework in study two is too complex to investigate in a single study. However, I have followed the line of argument by Koslowsky (1998) by adopting a comprehensive, multivariate approach that enabled me to test the various hypothesised links, including the simultaneous action of several stressors, moderators, and mediators. I believe that such a methodological procedure has provided me with a holistic and integrated picture that should set the stage for future research with great confidence.

Although the results of study two supported most of the hypotheses and are consistent with past research in their implications, there are a number of limitations that should be noted and preferably addressed in future research. The limitations are mainly methodological in nature, and will be discussed in this section.

First, the results of the study are based on correlational data, and therefore, they cannot be claimed to represent controlled organisational interventions. Additionally, the cross-sectional nature of the data does not allow us to make inferences regarding causality and reverse causation.

Furthermore, the temporal ordering of the study variables within the conceptual framework cannot be definitely established. For instance, the notion that physiological strains may lead to psychological strains, and that presence of both physiological and psychological strains may lead to the perception of higher levels of work stressors, can just as well be justified theoretically. Consequently, casual inferences with a cross-sectional design cannot be proven. However, the robust underlying theory and the empirical findings emerging from meta-analytic and longitudinal studies involving most of the hypothesised relationships has raised my confidence that the direction noted in the conceptual framework reflects a somewhat accurate picture.

Second, as in study one, the use of self-reports as part of the survey approach raises concerns about common method variance, which artificially inflates or attenuates associations between study variables (Podsakoff et al., 2003). Despite the fact that every precaution was taken to ensure rigour in the research project, including the use of multiple sources of data, the influence of common method variance could not be entirely eliminated. Specifically, all the constructs, with the exception of behavioural strain (objective measure of absenteeism) and hospital unit performance (external ratings), were measured by a single questionnaire, lending the study to the percept-percept bias, as workplace practices or experiences are measured through individuals' perceptions and associated with their attitudes. Spector (1987) suggested that percept-percept inflation is not as large in micro research on organisations, and that self-report methodology can lead to meaningful conclusions. Earlier on, Crampton and Wagner (1994) emphasised that specific research domains are particularly susceptible to percept-percept effects. For example, these authors found that variables conceptually close to the ones in the study, which is to say, goal-setting processes, organisational structure and culture, organisational commitment, performance feedback, and career advancement were relatively free of effect-size inflation. Unfortunately, among the list of variables that appeared to be particularly susceptible were job satisfaction, turnover intentions, and leadership. Crampton and Wagner (1994) also referred to domains, namely stress and anxiety, and intrinsic satisfaction with opportunity for creativity, level of responsibility and autonomy, in which percept-percept inflation is neither dominant nor absent.

Therefore, there is no doubt that study two has also been subjected to some degree of common method variance. In contrast to study one, I could take more measures to alleviate the problem since I designed the study from scratch. As recommended by Maurer et al. (2003), I collected data independently of the participants' employers by informing them directly and through their respective professional associations that the study in question was intended for research purposes and as part fulfilment for the attainment of a doctorate degree. This measure should have clarified any concerns about how the data will be used, thereby reducing the bias of social desirability. Furthermore, I administered surveys in a personalised manner to respondents, who were given ample time to respond in privacy, as well as to deposit the completed questionnaire in secured boxes. Confidentiality and anonymity was also emphasised throughout. In addition, the questionnaire consisted of psychometrically validated tools with, as suggested by Doty and Glick (1998), a variety of response scales or anchor. This I did partly to maintain the scales in their original format, but which also proved to have an advantage as a tactic to minimise bias.

However, a methodological strength of study two over study one is the availability of multi-source data. Indeed all publications on common method variance suggest having different sources of data in the explanatory and criterion variables, as an effective measure to overcome bias. Although the practice was not possible for all the hypothesised relationships in study two, the fact that the results from hypotheses groups two and four, which emerged from multiple sources of data, were consistent with those emerging from single source data, namely hypotheses groups one and three, is highly suggestive that this study has holistically provided meaningful conclusions. The effect sizes for hypotheses group four were smaller than those for hypotheses group one. The difference may have been due to the common method variance.

As noted by Pelled, Eisenhardt, and Xin (1999), intercorrelations between study variables that exceed 0.75 are considered problematic. The intercorrelations between study variables that were involved in multiple regressions failed to reach this magnitude. Scales were subjected to confirmatory factor analysis and therefore demonstrated factor uniqueness. Additionally, I adopted a rigorous approach in ensuring construct validity that included testing for both convergent and discriminant validity. As suggested by Hair et al. (2006), construct validity in conjunction with structural equation models was based on obtaining estimates for item reliability, construct reliability and average variance extracted. In general, all the constructs obtained acceptable cut-off points.

As study two is a multilevel study, it lends itself to group-level common method artefacts (Ostroff, Kinicki & Clark, 2002; Schulte, Ostroff & Kinicki, 2006). Cross-level and aggregate-level correlations might be influenced by group dynamics and social issues, leading to systematic bias. Specific to study two, leadership and team climates experienced by hospital unit staff members are assumed to be constant across individuals on the basis that they are subjected to the same practices, procedures and policies, justifying aggregation. Ostroff et al. (2002) explained that the variance of every measured variable can be partitioned into trait, method and random error components. Although I have attempted to separate these components using confirmatory factor analysis and structural equation modelling, this may not be entirely possible as trait and method variance may not be distinct. Specific to method variance across levels, the score for an individual-level variable x (Ostroff et al. 2002) is equal to $o_x + i_x + m_x + e_x$, where o_x= mean score across individuals within units; i_x = individual deviations from the mean of the unit; m_x = method variance component; and e_x = random error. Whereas o_x and i_x are known, m_x is unknown. Therefore,

A measure suggested by Ostroff, Kinicki & Clark (2002) is the use of split-sample design to assess the existence of method variance in multilevel studies. However, this is difficult to achieve. Specific to study two, I could have randomly selected half of the responding employees within each unit to the leadership and team climate items and the other half to report on social support and decision latitude/control. However, I decided otherwise as some of the units had low membership size and removing them from the sample would have seriously reduced the sample size of hospital units. Therefore, this study may be replicated using large sample of units with larger number of individuals per unit. This is however even more problematic for testing well-structured teams, which according to West (1994, 2001), should include less than fifteen members.

Acknowledging the difficulty of obtaining large enough samples to conduct cross-level or aggregate-level split designs, Ostroff, Kinicki and Clark (2002) suggested yet another solution for reducing the effects of method variance, namely that of incorporating time delays between the measurement of independent and dependent variables, based on the logic but empirically still lacking evidence that memory accessibility influences response bias.

Another measure, which I took, was of controlling for psychological well-being in the relationships that involved leadership, team climate, social support, and decision latitude/control. This I did on the basis that emotional contagion influences response, and that those who are psychological vulnerable would be affected by it. Despite all these measures, I cannot completely rule out all possible effects of common method variance in this study.

Third, the study included employees from a variety of occupations and professions, which, on the one hand, increases the generalisability of the findings, and therefore, may be considered a strength of study two; on the other hand, the diversity in the target population makes it more difficult to interpret the results for each professional group because of unique characteristics inherent in the specific discipline. For example, different professions have different working patterns, and therefore, they may interpret workload differently. Additionally, health care professionals in different disciplines have unique expectations from their careers, which may in turn influence the level of perceptions when answering questions throughout the survey. As far as possible, control variables were inserted throughout the analysis to achieve the best possible accurate results.

Fourth, some of the hospital employees could have been involved in more than one unit within the hospital at the time of data collection. Every precaution was taken to ensure rigour in the design of the questionnaire, with specific instructions for the survey participant to answer questions related to the unit, where they spend most of their working time. Nevertheless, perceptions could have been clouded by work experiences from other units, and therefore, could have unknowingly introduced a bias in the measurement of perceptions.

Fifth, unlike study one in this thesis, study two included just one organisation, and therefore, results should be interpreted with caution before generalising results to other organisations and populations. In addition, I assumed that the units are independent of each other, something which in reality may not be the case. This is because within one organisation, one would expect a certain degree of inter-unit relations, which in their own right may be both positive and negative. Furthermore, hospital employees are not randomly assigned to units. Ostroff et al. (2002) argued that just as employees within organisations are more likely to be similar than employees in other organisations, response bias may be more prevalent in some units than in others.

Sixth, in an attempt to obtain the best possible sample size, the survey targeted the full population of the groups of hospital employees included in the study. Consequently, random sampling, which is considered a basic assumption in parametric statistical tests, was not carried out. In addition, although the response rate of sixty percent can be considered as reasonably good when compared to the response rates of similar organisational studies, the additional information on the remaining substantial forty percent could have provided a more complete picture of the aggregated scores of the transformational leadership and team climate in hospital units.

The maximum likelihood estimation methods used in multilevel analysis are asymptotic, and therefore they assume a large sample size (Hox, 2002). With increasing sample sizes at all levels, estimates and their standard deviations become more accurate. The sample size at level-one may be considered acceptable and provides enough power for statistical interpretation of results. However, for level-two, the sample size dwindles to one hundred thirty-six. Nevertheless, the use of multilevel techniques would result in a strengthening of statistical power as different levels retain their identity and sample sizes. Kreft (1996) suggested that researchers should strive for a sample of at least thirty groups if the interest is mostly in the fixed parameters and hundred if the interest is more on the random part. With regard to the number of individual within each group, Hox (2002) claims thirty if interest is on the fixed part and ten if interest is on the random part of the model. Still, this issue is still largely debateable, and there is as yet no hard and fast rule (J. Hox, personal accomplishment, May 9, 2007). This study appears to have satisfied the recommendations set for sample sizes, except for number of individuals within each unit, which varies from three to seventy-seven. However, all multilevel regressions were controlled for unit size.

Seventh, while the conceptual framework of study two is comprehensive and takes in consideration a wide array of work stressors and strains, a further limitation is that it did not address other known, and perhaps more objectively measured outcomes, resulting from the work stressor-to-strain relationships in hospital practice. These may include, for example, mortality and morbidity statistics, the length of stay of patients, re-admission to hospital, and patient satisfaction measures.

Eighth, there might have been other variables which could have influenced the relationships under study, but which were virtually impossible to control for, in their entirety. Although explanations of spuriousness can be better ruled out if more potential third variables are included, I have prioritised on the choice of control variables based on theory, and empirical evidence. Multiple regression analysis was carried out on the guidelines provided by Cohen, Cohen, West, & Aiken (2003).

Ninth, in hypotheses-testing of group four, when one considers the effect sizes of the standard multiple regressions as ranging from 4.4% to 5.1% of the variance, which in Cohen's terms (1998) would mean small to moderate effect sizes, one might argue that these are not enough to claim practical significance. On the other hand, effect sizes in field studies, although generally small, are still considered meaningful (McClelland & Judd, 1993). Therefore, although there must be caution before drawing firm conclusions from the present data, the observed effect sizes are consistent with expectations.

Along with the limitations discussed above, study two has a number of major strengths. Recognising and accounting for multilevel structure when analysing data from organisational studies can lead to more accurate conclusions, as well as offer opportunities to explore contextual effects and differences across higher-level units. Other strengths include analysing a fairly large sample; taking every effort at ensuring rigour by attention to detail in the organisation of the survey and data collection; utilising psychometrically validated measures; and the use of second source objective data for absenteeism and second source self-report but multiple-rated performance data. When analysing external ratings, every effort was taken at reducing inter-rater bias by means of statistical correction. Additionally, this study advances the understanding of multiple levels in occupational stress research by taking into consideration the fact that individuals within organisations are nested in groups.

Despite the limitations addressed in this section, this study has considered for the first time that transformational leadership and team climate shape up the quality of the social environment across hospital units. At the same time, they shed light on not only the strain reducing buffering effects against work stressors perceived by unit members of staff, but also on the association with externally rated unit-level performance. Replication of these findings is recommended to avoid the suspicion that sample-specific attributes might have affected the results. If replicated in longitudinal studies, as well as in larger representative samples within more organisations and in other populations, these findings may serve as important health care policy implications for hospital management, clinical leaders, health care professionals, and hospital employees with regard to human resource, stress, and performance management interventions.

9.4 Conclusion

In conclusion, this chapter has discussed the research findings of study two, in relation to theory and published literature. The limitations and strengths of the study were also taken into consideration. The next chapter, which is the concluding chapter, deals with the implications of the research findings to theory, management, and practice. A number of avenues for further research will also be explored.

CHAPTER TEN

STUDY TWO
INTEGRATION AND CONCLUSIONS

10.1 Chapter Summary

The aim of this chapter is to address the implications for theory, management, and practice. It also deals with several avenues for future research based on a series of issues emerging from study two. These include conceptual, methodological, and generalisability issues as well as questions regarding the level of analysis. A number of issues specific to research in occupational health will also be treated.

10.2 Implications of Study Two

In this section, I will address the implications of study two for theory, management, and practice.

10.2.1 Implications for Theory

The underlying theory is robust and the conceptual framework has integrated the theories of transformational leadership (Rafferty & Griffin, 2004) and team climate (Anderson & West, 1998) with the Demand Control/Support Model (Karasek & Theorell, 1990), the Job Demands-Resources Model (Schaufeli, 2004), and also with the Structural Model of Burnout (Maslach, Jackson, & Leiter, 1996). Furthermore, the social support (House, 1981) and social influence theories (Van Avermaet, 2001) provided the theoretical background for the stress-buffering hypothesis within the context of social interactions, inherent within the leadership process and as part of the group dynamics of teamwork.

Beehr's Facet Model of Occupational Stress (Beehr, 1998) provided the conceptual link for the moderated stressor-strain relationships with the human and organisational consequences. The human consequences include the three types of strains, namely psychological, physiological and behavioural strains, whereas the organisational consequences include the impact on performance within hospital units. Finally, through Walburg et al's Clinical Microsystem Model (2006), unit-level transformational leadership and team climate links up with hospital unit-level performance.

However, the results of this study offer various unique contributions and implications for knowledge and theory. At the first instance, study two sought to adopt a multilevel approach within the subject area of occupational stress research. Koslowsky (1998) argued that the nature of stress research generally affects individuals more than the higher levels of analyses. However, it would be inappropriate to ignore potential stimuli originating from shared environments that might influence individuals, or indeed, groups of people, and therefore to assume vis-à-vis the latter that the group rather than the individual is the major source of stress.

Study two targeted hospital employees nested within units; therefore, the research design dictated the consideration of multilevel issues. The indices of within-group agreement and intraclass correlations in this study suggested that there was a shared variance.

Therefore, this study acknowledged the fact that stress and intervening variables might have multilevel sources, and as suggested by Koslowski (1998), it gathered information on the employees' social environment while gauging the various links in the stress-strain relationships. As suggested by Bliese and Jex (2002), a notable implication for theory is to integrate the theoretical points with statistical models to help illustrate how one can test multilevel occupational stress propositions.

Furthermore, the organisational behaviour of employees within a hospital setting is in response to many stimuli originating at different levels. Koslowsky (1998) argued that management is often perceived to be synonymous with the organisation, so much so that employees might attribute specific negative reactions to both interchangeably. This study, however, focused on the leadership process at unit level, as a form of group representation with management, and also as a construct that is associated with the quality of the social environment in providing the right elements that may mitigate the effect of work stressors.

This line of reasoning justifies the decision to look beyond the social support and decision latitude/control as the moderator variables in the conceptual framework. Indeed, the results of this study suggest that the style of leadership, in the form of transformational leadership, is positively related to the unit-level climate for social support, whereas team climate is associated with the unit-level climate for both social support and decision latitude/control.

Above all, the results suggest that the unit-level measures of leadership and team climate appear to predict the level of the externally-rated unit-level performance within hospital practice. Whereas the results showed consistency through which unit-level team climate predicted the unit-level climate for both moderators and also predicted externally-rated unit-level performance, the same cannot be claimed for unit-level transformational leadership, in that transformational leadership failed to significantly predict unit-level climate for decision latitude/control, as well as externally-rated unit-level performance, except for one of its sub dimensions *vision*, in the case of the latter.

Nevertheless, it is justifiable to note that another implication for theory is the consideration of transformational leadership and team climate as two determinants of the quality of social environment generated within units. Indeed, as already stated, it is through the social support and social influence theories that I argue in favour of looking beyond the strain-reducing effects of social support and decision latitude/control in occupational stress theory, as these are bound to be determined by the leadership style and team climate across groups. What is intriguing in this study is the consideration of the impact of the unit-level social environment on the individualistic work stressor-to-strain relationships, and then relating the units' social environment, as well as the cumulative effect of the individual differences in the mediated stressor-strain relationships to how well their units perform as rated by external raters. This study suggests that hospital units vary on their unit-level climate for social support and decision latitude/control, as well as on their levels of transformational leadership and team climate. It also suggests that the strength of this climate will moderate the individualistic work-stressor-to-strain relationships.

Although the underlying theory was mainly based on Karasek's DC/S model, with regard to the central part of the conceptual framework, namely the work stressor-to-strain relationship, this study looked beyond job demands. Other work stressors, which are known to occur on a day-to-day basis, were considered and statistically significant buffering effects were found. Therefore, this study suggests that a wide perspective of stressor-to-strain relationships which are tailored to the specific organisational context should be considered in occupational stress research.

Finally, as argued in the introductory chapter, the study would have been incomplete had I ignored the external view of how the hospital units performed. Study two took into consideration hospital-unit performance as an outcome measure, and the way in which this performance was related to the working practices and the work stressors perceived by the employees within units. The results showed statistically significant multilevel relationships, and argued in favour of incorporating performance outcome measures at the unit, rather than at the individual level in future theoretical frameworks on occupational stress, particularly when the research design involves employees nested within units.

10.2.2 Implications for Management

The implications of study two for management are several. As stated in chapter one, the physical and psychological well-being of hospital employees has wide-ranging and far-reaching consequences, the most important of which being the impact on their performance, and therefore, on the quality of delivery of patient care and assurance of patient safety.

This thesis has consistently, theoretically and empirically, emphasised that occupational stress is associated with physiological, psychological, and behavioural consequences. Furthermore, study two has uniquely contributed to our knowledge, in that hospital employees' work stressor-to-strain relationships were significantly related to externally-rated unit-level performance. Therefore, the results suggest that it is in the best interest of health care policy makers and hospital management to increase their awareness of occupational stress not only at the organisational level, but also specifically across hospital units, and explore all avenues on how to confront it.

First, the results of study two suggest that as hospital employees are in real life working in groups, or units, management should make sure that the quality of the psychosocial work environment within these groups/units should be conducive to a healthy working life. The results highlight the notion that the levels of transformational leadership and team climate in these units have an impact on the social support perceived by employees within these units.

Furthermore, as claimed by Karasek and Theorell (1990), decision latitude/control plays a critical role in the development of strain. Indeed, the results of study two suggest that this control is associated with the level of team climate achieved across hospital units. Therefore, a holistic view of these results suggests levers for management interventions to invest in leadership development and to build well-functioning teams. This should involve the recruitment of the right skill-mix to create diversity in professions, expertise, and skills that should be complementary to each other while ensuring that those recruited are prepared to be team players.

Additionally, the choice and training of the leader, preferably on the transformational leadership ideals, should be considered as being decisive not only for managing the unit effectively, but also for leading a well-functioning team. Finally, this thesis has shown in its critical review of the literature on teams that hospital management should be responsible for the development of team-friendly policies that would support and sustain teams.

Second, this thesis has consistently showed that a diversity of work stressors exists in hospitals. Therefore, the results should prompt hospital management to design units and jobs in such a way as to minimise those work stressors which, at face value, might appear to be primarily determined by the organisation, namely organisational constraints, organisational change, interpersonal conflict, and incidents at work. For example, employees that experience high interpersonal conflict within their unit are less likely to share information, participate in teams, come up with new ideas, and make decisions serenely.

Furthermore, management should undergo frequent scientific operations reviews of units to obtain a clear understanding of the nature of work, thereby gaining first hand information on how the units should operate efficiently and effectively. In other words, work demands and workload should not exceed certain levels to avoid burnout. On the other hand, jobs should all achieve a minimum level of quantitative workload. In fact, as the results suggest, employees in the more 'active' units seem to enjoy lower levels of psychological and physiological strains.

Third, the results of study two supported the buffering hypothesis of the work-stressor-to-strain relationships by means of a number of significant two-way and three-way interactions involving the moderator variables, namely social support and decision latitude/control. The implications for management are two-fold. On the one hand, management should ensure that the hospital is equipped with the infrastructure to adequately support its employees in their day-to-day activities. On the other hand, management should ensure that hospital employees are enjoying the level of decision latitude/control that they are trained for as health care professionals. However, this should happen within a set-up of clinical governance and audit, whereby the quality of decision-making and delivery of services are benchmarked with the best clinical practices.

Fourth, the results on hospital performance provide implications for management also on two counts: first, the association with the levels of transformational leadership and team climate, which emphasises the need to invest in both areas, and second, the association with the work stressor-to-strain relationships, whose intent is to confirm the levers for management to buffer these relationships.

10.2.3 Implications for Practice

Apart from implications for theory and management, this study also has practical implications for the health care professionals and other support staff within hospital practice.

Although the results for transformational leadership were not significant for all the relationships tested, the study still provides meaningful recommendations on the qualities of transformational leadership for leaders in hospitals. These include practising flexible, adaptive, and supportive leadership; ensuring that leaders and followers alike have a clear vision; applying intellectual stimulation and inspirational communication; and, above all, recognising followers as unique individuals. The major practical implication here is the formalisation of leadership training targeting primarily management and clinical leaders.

The results for team climate were more convincing and offer several key implications that proved to be critical for the effective performance of hospital units.

At the first instance, health care professionals, clinical leaders and top management alike, should strive towards building well-structured teams in terms of size, diversity, and synergy.

Secondly, the results from this thesis are consistent with the ones that have been published. If team members participate actively, have clear objectives, support innovation, and strive towards achieving a team task, they are less likely to experience stress, and more likely to feel supported and satisfied. They are also more likely to achieve better levels of performance for the welfare of their patients under their care.

The results for the buffering hypothesis offer two practical implications. First, Hospital employees should be aware that the more support they receive from their supervisors and co-workers, the better they can withstand the work stressors. This awareness should drive staff towards achieving better interpersonal relationships. Additionally, they should ensure that they themselves can provide instrumental support by offering direct and practical help as well as emotional support, by showing an interest in and understanding of problems, by furnishing informational support, by providing others with useful information, knowledge, and appraisal support, and finally, by giving adequate feedback on performance that may influence a person's self-esteem. Second, there is enough evidence to suggest that the level of decision latitude/control does have an impact on strain. Thus, a practical implication to health care professionals is to update their knowledge and skills continuously so that they will be in a better position to utilise their skills, to be empowered in decision-making, and to take responsibility for their decisions.

Study two raises awareness regarding the impact of work stressors on performance, and the ways in which physical and mental well-being may be mediating this relationship, while support and control may be buffering the employees from the stressors. Therefore, practical implications in this regard are to design jobs that increase workplace control, and to ensure that support is forthcoming.

Performance appraisals should be targeted at determining whether support and control mechanisms are in place, and the extent to which these can assist employees and units to enhance their performance. Through training, clinical leaders, supervisors, and managers could learn how to assist their employees in using proactive coping strategies when counteracting negative work conditions. At the same time, they could also learn how they can improve their performance.

The performance criteria of these leaders/managers should emphasise their supportive role. In addition, hospital jobs should have support mechanisms in place, for example, the formalisation of mentoring schemes. With regard to new recruits, on the job-training and socialisation programmes should provide the right moment for communicating information about working conditions, support mechanisms, and risk reduction strategies.

Finally, the literature and results from this thesis intend to raise the awareness of the major stressors which hospital employees are faced with on a day-to-day basis. In doing so, they will be better prepared to overcome these stressors, to adopt healthy work attitudes, and to avoid developing psychological and physiological strains. Very importantly, they will be able to maintain optimal standards in their practice for the good of the patient, as well as for their satisfaction and career progression.

Furthermore, organisations should consider introducing regular evaluation exercises of working conditions, a proper assessment of the nature of work in each unit, and regular meetings with leaders to monitor instances of interpersonal conflict or incidents at work. Lastly, organisations should plan major changes months ahead, and keep employees well informed throughout the process, from the planning to the implementation stages.

10.3 Avenues for Future Research

Study two suggests a number of interesting avenues for future research. These include conceptual, methodological, and generalisability issues; issues regarding level of analysis; and finally, issues specific to research in occupational health.

10.3.1 Conceptual Issues

The theoretical foundations for the occupational stress research in this thesis are the interactional models of stress that include Karasek's DC/S and Maslach's Burnout Models, which are arguably the most cited models in the field of stress.

Study two attempted to expand on Karasek's DC/S model, which focuses on specific work stressors, strains, and moderator variables. Therefore, they may be too simple or lack comprehensiveness with regard to the type of stressors to which employees are subjected in real life. Additionally, there may be other variables that buffer the effects of work stressors, apart from social support and decision latitude/control, and which were not studied in this thesis. Peeters and Rutte (2005), for example, identified time management as a buffer. Future research should thus investigate more potential relationships within the buffering hypothesis of stressor-to-strain relationships, the results of which can have important implications for management and practice.

In the majority of studies using the DC/S and Burnout Models, stress has a negative connotation in terms of its negative perceptions and consequences. However, there is still a lack of conceptual clarity as to what constitutes a work stressor, and more importantly, when it is part of distress (negative) or eustress (positive). Despite the burgeoning literature on stress, research on the positive effects of stress or rather the positive work stressors has only been recently emerging. James and McIntyre (1996) argued in favour of considering stress as having beneficial connotations in certain situations/conditions, especially for individuals or groups, who have a high level of achievement motivation, thereby perceiving certain 'stressful' environments as positive and satisfying.

Indeed, quantitative workload in study two consistently showed beneficial effects in that higher levels of quantitative workload were associated with lower levels of psychological and physiological strains. Therefore, future research should concentrate on identifying situations or conditions that may alter some of the usually negatively perceived work stressors into positive challenges. Future research should also focus on identifying clear characteristics of the person-environment fit, as it is known that some employees would fit better in some jobs than in others. Through this knowledge, organisations may be able to design jobs, shape social environments, and recruit the right people to minimise negative effects while ensuring high levels of performance.

In the same line of argument, there is a drive by scholars like Schaufeli and Bakker to shift the emphasis from negative to positive psychology, and therefore, from studying the negative aspects of workers' health and well-being, to an increased focus on scientific study of human strength and optimal functioning.

Indeed, there is a rapidly growing debate on the distinction of burnout from job engagement, and there appears to be a lack of conceptual clarity as to how the two should be considered in relation to each other. Two schools of thought exist. The first approach by Maslach and Leiter (1997) has to do with the assumption that burnout and engagement are opposite poles of a continuum of work related well-being. As a result, low scores on the exhaustion- and cynicism- scales and high scores of personal accomplishment scale of the MBI are indicative of engagement. The second school of thought by Schaufeli and Bakker (2003) assumes that burnout and engagement are two distinct concepts that should be assessed independently, and therefore, enables the assessment of the strength of the association between the two, or the prediction of an outcome variable by either burnout or engagement after controlling for the other.

Intriguing questions by Langelaan et al. (2006) namely, "why do some employees report high levels of burnout or high levels of job engagement whereas others do not?" and "why do some employees thrive in particular jobs , whereas others do not?" (p.522) should form the basis for further research in the area. A fruitful avenue would be to use concepts within positive psychological research, and to adapt them to the multilevel approach. Indeed, I intend to modify the conceptual framework adopted in study two in order to illustrate the work stressors-to-job engagement-to-performance as forming the basis for future research.

Finally, yet another debateable conceptual issue is the recognition of individual versus group performance. Performance appraisals are largely based on individual performance, although the individual's contribution as a team player is increasingly being recognised. Earley (1994) claimed that people's self-concepts are partly regulated by their cultural orientation and values. For example, a worker from an individualistic culture endeavours to perform optimally to receive recognition, whereas a worker from a collectivistic culture strives for collective improvement and group success or recognition. Study two specifically looked at collective performance of hospital units at the expense of focusing on individual performance. Therefore, future research may replicate the study, but greater attention to individual performance aimed at achieving an understanding of how the hypothesised relationships, may change if one considers a purely individual outcome.

10.3.2 Methodological Issues

The underlying philosophy of research in this thesis is that of positivism, and it utilises a quantitative methodology. One might argue that if complemented by qualitative methods, this research would provide a more thorough understanding of the social networks and interpersonal relationships that shape up the specific hospital units' social environment, and indeed, the climate prevailing within these units.

Furthermore, despite the fact that field studies represent the real world, experimental studies would provide a more controlled design, minimise the effects of extraneous factors, and examine the effects before and after specific interventions. Additionally, the findings from experimental studies enhance the researcher's confidence of claiming causality in cause and effect relationships. Above all, complementary methodologies would help in triangulating the findings of this research.

Study two is cross-sectional in design. Apart from acknowledging this structure as a major limitation, I have already mentioned in the methodology chapter six that I continued collecting data at six monthly intervals and I intend to present the findings of the longitudinal research in the very near future. The cross-sectional nature of study two provides a threat to internal validity of indistinct temporal order of occurrence which prevents me from asserting the direction of causality. The major advantage of using a longitudinal design, and therefore, of introducing the element of time as a critical feature in occupational stress research, is to arrive at cause-effect inferences, since cross-sectional studies are particularly sensitive to reverse causation. This is especially true in the case of self-reports of both independent and dependent variables, when causal statements are meaningless (Koslowsky, 1998). However, a rigorous design, preferably complete panel and appropriate statistical procedures whose intent is to increase the probability of true cause-effect and to confirm/exclude the occurrence of reverse causation or third variable influence, must accompany longitudinal studies.

A methodological problem in research is measurement error in the variables. For example, the stressor and strain variables may not be measured accurately due to deficiencies in the instrument, or to other factors deemed to be beyond the control of the researcher. Measurement error explains why observed correlations in field research, resulting in particular from self-reported findings, is limited in magnitude. I have tried to minimise measurement error by using psychometrically validated tools, and by conducting the analysis using structural equation modelling which accounts for measurement error. Furthermore, the adoption of multilevel techniques further partitions error in different levels. The accuracy of results is thus improved. However, in this regard, an avenue for future research can involve the use of a multi-method approach or the use of more objective measures of stressors and strains.

10.3.3 Generalisability Issues

The external validity of study two was limited by the fact that it was conducted within a single organisation and within a single context, where there could be unique factors that affected the hypothesised relationships. As a result, the generalisability of the findings and conclusions should be drawn with caution. Two main generalisability issues that emerge from this thesis warrant discussion.

The first main generalisability issue: Study two focuses merely on a single large hospital. Additionally, the study involved one context, namely hospital practice, and therefore one industry, namely the health industry. Organisations, contexts, and industries have their unique background factors, which may provide alternative explanations to the hypothesised relationships. Therefore, before generalising results across organisations, contexts or industries, one should replicate the study across these different scenarios.

A fruitful avenue for future research is to replicate the study in a number of different hospitals. However, this is not possible in Malta due to the limited number of hospitals, and therefore, it has to be done in other European countries, the UK being the closest in culture to Malta, which was a British colony for more than a century. Moreover, to generalise the findings across societies, it would be necessary to replicate the study outside the Anglo-Saxon world.

This research focused on the health service, more specifically on hospitals. An intriguing question as a researcher would be whether the results could be generalised to other industries in order to evaluate whether variables, pertinent to the health sector, (for example, work stressors and performance measures) can apply to other situations.

The second main generalisability issue concerns the tested hypothesised relationships in the conceptual framework of study two. First, this research tested the buffering hypothesis of work stressor-to-strain relationships in an over-arching manner prior to testing for specific work stressor-to-strain links. However, I cannot claim that this is an-all inclusive list of work stressors and strains, for all employee levels, within any working environment, and in all types of industries.

Secondly, I investigated only one model of leadership namely, Transformational Leadership, on the assumption that this is the model that best approaches effective leadership, particularly within a hospital environment. Therefore, it would be interesting to investigate relationships between differential aspects of leadership styles and leadership effectiveness, which can be measured in terms of leader-environment fit and performance measurement. Moreover, study two focused on one level of leadership, namely unit-level leadership. Indeed, as already discussed in chapter three, there are various levels of leadership within an organisation that might also be considered in future research.

10.3.4 Level of Analysis Issues

Throughout the thesis, the level of analysis issue has already been discussed thoroughly from a theoretical, conceptual, and statistical point of view. Future research may, however, consider an aggregation of some of the variables that showed shared variance at unit level, while theoretical justification may still be debateable. Furthermore, based on the argument of emotional contagion, should I have considered some of the psychological strains at the higher level? These and other questions may come out from the present study that may pave the way for further research, the results of which may consolidate the implications for management and practice in focusing on the unit/group level rather than solely on the individual when formulating strategies or designing work practices.

10.3.5 Occupational Health

As a medical practitioner who has acquired the skills and knowledge within the field of work and organisational psychology, I feel greatly motivated to look beyond, and to apply the research specifically to the field of occupational health. Karasek and Theorell (1990) have done notable work in linking the DC/S model with coronary heart disease in a period of longitudinal research spanning over ten years. Indeed, the DC/S model features prominently in the medical literature on the prevention of ischaemic heart disease. Burnout has also featured extensively in the field of psychiatry and is being given prominence in the literature on mental health. Furthermore, the symptoms within the domain relating to physiological and psychological strains can lead to various avenues of research opportunities, especially when one considers that work constitutes a predominant part of life, and therefore, research in this area has enormous and wide-ranging implications. What would be of great importance from the occupational health perspective is to look at the influence of group dynamics within a multilevel approach on the results already published by Karasek, Theorell and colleagues.

10.4 Conclusion

In sum, this study meets an important need in the occupational stress literature in hospital settings, with several critical findings of strain-reducing moderated and mediated relationships that affect performance. These findings have wide-ranging and far-reaching implications particularly on the quality of health care delivery.

This thesis creates links via its research findings between the contextual social environment, the buffering mechanism of hospital employees against work stressors, and hospital unit performance.

The term "social environment" refers to the prediction of the moderator variables, which includes social support and decision latitude/control, by transformational leadership and team climate. This study, therefore, raises our understanding of how social contextual factors namely, leadership, team climate, social support and decision making freedom, which are prevalent within units or departments, influence the manner by which employees withstand work stressors.

Moreover, via the implications of the results to management and practice highlighted in this chapter, this thesis provides several recommendations for hospital policy makers and clinicians with the intent of directing their full attention to work practices and job design, that will help them achieve the desired contextual environment, and consequently, their optimal performance.

This study demonstrates that unit-level transformational leadership is positively associated with unit-level climate for social support, whereas unit-level team climate is positively associated with unit-level climate for both moderators. At the same time, this study identifies a number of moderating effects which social support and decision latitude/control, separately and together, had on specific stressor-to-strain relationships. The results show significant mediated stressor-to-strain-to-unit performance relationships.

Furthermore, at the higher level, externally-rated unit-level performance is positively associated with unit–level team climate and with unit-level *vision*, which is one of the five sub-dimensions of transformational leadership. At the same time, unit-level performance is also positively related to both unit-level transformational leadership and team climate when the two constructs are tested together. Therefore, based on these results, organisations would do well if they invest in leadership training and team building.

Finally, this research calls for a better understanding of work stress experienced by employees in the helping professions. Rather than basing knowledge on mere anecdotal literature, policy makers need empirical evidence regarding the type and extent of work stress, and also the factors that mitigate the stressor-strain link.

In this respect, the thesis contributes towards further knowledge which may assist policy makers in making informed choices on designing better jobs and work practices. In conclusion, my study is a crucial reminder that working smarter rather than harder is the solution for providing the best care for the greatest number of patients receiving health care.

After all, as the 1921 Nobel Prize winner in literature *Anatole France* proposed:

> *To accomplish great things, we must not only act, but also dream, not only plan but also believe.*

Indeed, all those involved, in one way or another, in the helping professions can achieve great things if they truly dream and believe that they can be instrumental in improving the lives of other people.

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APPENDICES

Appendix 1: Research Setting of Study Two

Study two was conducted in Malta, a small archipelago of islands made up of three main islands: Malta, the largest island, Gozo, and Comino. The Hospital involved in this study is located in Malta.

Malta: Geography and Demography

Malta is located in the centre of the Mediterranean Sea with Sicily 93 km to the north, Africa 288 km to the south, Gibraltar 1826 km to the west and Alexandria 1510 km to the east. Malta has a total land area of 315 km^2 and is the most densely populated European Union (EU) Member-State, with an average of 1,282 residents per square kilometre (Azzopardi Muscat, 1999). The demographics of the Maltese population provide background information to assist the reader in achieving a better understanding of the utilisation of services at the Maltese General Hospital, which is the organisation involved in this study.

The Maltese population is approximately 404,039, of which 200,715 or 49.7% are male residents and 203,324 or 50.3% are female residents (Central Office of Statistics, 2005). Only 31, 053 people live in Gozo and Comino. The 2005 census shows that 65+-age group represents 13.7 per cent of the population. On the other hand, persons under 25 years of age made up 31.5 per cent of residents, compared to 36.6 per cent in 1995 (Central Office of Statistics, 2005). Since the 1967 Census, there has been a definite shift in the age composition of the population with the indications being that of an ageing population, mainly due to lower fertility rate and improvement in longevity.

Map of the Maltese Islands

Malta scores high on the Human Development Index with a life expectancy of 76.6 years for males and 80.5 years for females. The infant mortality rate is 5.9/1000 live births. The birth rate has been steadily declining, and is currently one of the lowest in the Mediterranean countries. The crude birth rate is 9.66/1000 and the crude death rate is 747/100,000. The male to female ratio is 0.99, the dependency ratio is 0.45, and the old-age dependency ratio is 0.2. Coronary heart disease and stroke are the major cause of mortality and morbidity. They account for 42% of deaths. Cancers account for 24% of deaths. Accidents are an important cause of death in those under 65 years. Diabetes is a significant national health problem with a prevalence of 10.3% in adults over the 35 years of age (Data are for 2004, Central Office of Statistics, 2005).

The changing demography, morbidity, and mortality statistics have influenced health policy planners to update health services strategy and develop specialised medical and surgical services, as well as geriatric and rehabilitative services. Health care has therefore increasingly gained a multi-dimensional perspective, so much so that the need for a holistic approach is inescapable. This has prompted health educators to shift their focus from a pure dominance by the medical profession to one where all the health care professions are adequately educated and trained.

Indeed, education in nursing, midwifery, and professions allied to medicine were elevated onto an academic platform in 1989, under the Institute of Health Care. The dominance enjoyed for so long by the medical profession is no surprise when one considers that the Faculty of Medicine and Surgery at the University of Malta is one of the oldest in Europe, established at the time of the knights of the Order of St John, by Grand Master Nicolò Cotoner in 1676 (Savona Ventura, 2004).

Bearing in mind Malta's relative geographical isolation as an island, the provision of comprehensive health services and the recruitment, training and retention of highly skilled health care professionals are the greatest challenges for policy-makers, (Azzopardi Muscat & Grech, 2006).

Malta's Historical Background

In 1800, Malta voluntarily became a colony of the British Empire. Malta gained Independence Status from Britain in 1964 and became a Republic in 1974. The British Forces left the island in 1979. Under British rule, the island was a military and naval fortress, and also the headquarters of the British Mediterranean fleet.

The influence of the British in Malta is still evident in civil society, including in education and health services. Health policies, human resource policies as well as training and regulation of health professionals are similar to those found in the United Kingdom. A significant number of health care professionals obtain further qualifications and experience in the UK. There is also close contact between Malta's Medical School and Institute of Health Care with several British academic institutions. On a negative note, Malta regularly loses a significant number of health care professionals because of their decision to further their career and take up employment overseas, namely in the UK.

Before the arrival of the British, Italian was the spoken language of the educated, but the increased use of the English eventually changed this. In fact, in 1934, under the British Crown Colony Status, English and Maltese became the sole official languages. English is the predominant language used in schools and at University for all subject areas, except

Maltese. However, Maltese is the spoken language for the majority of Maltese. As the target population involved in the Malta Study consisted mainly of health care professionals with tertiary level education, the language used in the questionnaires and external rating tool was English. Therefore, conducting research in Malta, using tools validated in the UK, is reasonably feasible because of the language and proximity to British culture.

Malta as Member State of the European Union

The accession of Malta as a member state of the European Union (EU) in May 2004, has proved to be the most determining factor affecting human resources in health care in recent years. All health professionals qualifying from the University of Malta and, since May 2004, from universities of the European Economic Area are automatically eligible for registration with the relevant professional body. Some professions, namely doctors, dentists, midwives and pharmacists, receive a licence from the President of Malta to practise independently.

The EU *acquis* on mutual recognition of professional qualifications led to the enactment in Parliament, of the Health Care Professions Act that fine-tuned Maltese legislation on regulation of the health professions to be in line with Europe. Four statutory bodies regulate the health care professions, namely the Medical Council (for doctors and dentists), the Pharmacy Council (responsible for pharmacists and pharmacy technicians), the Council for Midwives and Nurses, and the Council for Professions Complementary to Medicine. The Health Professions Act also led to the setting up of specialist accreditation committees in medicine and dentistry, awarding specialist status.

EU accession appears to have facilitated a brain drain of young medical professionals, to the extent that in the years immediately following accession, about 70% of medical graduates migrated mainly to the United Kingdom and the United States. Furthermore, most of the health professionals who specialize abroad do not return to Malta. At the same time, Malta has negotiated a seven-year period with the EU, during which it may restrict immigration of workers from the European Economic Area, if serious imbalances occur.

Of relevance to this research, several EU directives and policies are worth mentioning. Firstly, the EU employment policies include the introduction of an additional week of maternity leave and the prohibition of night work for pregnant women. The adoption of the EU Working Time Directive in Malta created grave problems for hospitals, as it restricts the total working time per week. At present, many of the specialists and doctors in training have opted out of the directive and work up to 50–60 hours per week. The revision of the directive is a sensitive issue for Malta, such that a potential withdrawal of the right to opt out would require the hospital to increase its medical manpower at senior registrar level by twice as much (Azzopardi Muscat & Grech, 2006).

Secondly, the European Union's Framework Directive 89/391/EEC (Commission of the European Community, 1989) lays out the responsibilities on policy makers and management regarding risk management on the work place. Indeed, Ward (2002) in a research report on the perceptions of health and safety in Malta specifically acknowledges and provides solid epidemiological arguments that psychological stress at work appears to be a risk factor to organisational diseases in Malta. The UK Health Service Executive, whose aim is to assist the Maltese Occupational Health and Safety Authority in meeting their obligations under EU law, carried out this report. Cox (1993) argues that the EU Framework Directive does not only focus on tangible hazards of work but also includes psychosocial and organizational hazards that include stressors and strains.

The Maltese Health Service and the Hospital under Study

The Maltese health care system operates by means of a national publicly financed integrated health care system, which is free at the point of use. Private health care has a significant but much smaller role, and this mainly exists at GP level and at three (75-bed, 80-bed, and 15-bed) hospitals.

The health sector is one of Malta's largest employers, employing 7% of the total workforce. The focus of the state health care system in Malta is mainly on hospital care, which is the context of this research and mainly centred in the main general hospital involved in this study.

Bearing in mind that this study adopted a positivist approach and a quantitative methodology, the context is an important issue to consider in view of the desire to achieve generalisability of results beyond the population under study. Indeed, the context may be a confounder of the hypothesised relationships (Fulop, 2002), where some of the variables in the organisational environment may not be easy to detect and control.

The study was carried out in the 880-bed hospital that incorporates specialised ambulatory services, inpatient care, and highly specialised care such as heart surgery and transplantation.

The hospital covers most of the tertiary care needs, with a few patients sent overseas, usually to the United Kingdom for care not available in Malta. Besides the main general hospital, there are four other state hospitals, excluded from this study, namely a 680-bed psychiatric hospital, a 260-bed general hospital in Gozo, an 80-bed dermatology, and oncology hospital, and a 60-bed acute geriatric rehabilitative hospital (Azzopardi Muscat, 1999; Azzopardi Muscat & Grech, 2006).

The Move to a 'New Hospital'

In the 1980's, and more so in the 1990's, the main general hospital started facing problems with bed blocking and overcrowding. This was due to its inability to cope with the increased demand for health care created mainly by the changing demography and advances in medical technology and services.

In 1992, the Government took a decision to build a 450-bed university hospital for research and specialized elective care. Successive changes of government and other developments modified this decision, and as a result, the design of the 'New Hospital' grew into an 850-bed state-of-the art general acute hospital intended to replace the pre-World War 2 hospital (the hospital under study). Construction started in 2000 and is due to open in July 2007. In planning for a smooth transition, the health authorities have conducted major discussions and negotiations with health professional associations and trade unions.

As I was planning my research, and during several preliminary meetings with hospital management, I realised that I could not ignore the unique and major organisational change of a move to a 'New Hospital' as a work stressor, more so when this study aims at researching the stressor-to-strain relationships perceived by health care professionals. Therefore, I wanted to capitalise on the timing of this research, whose data collection was to take place on the eve of the hospital migration process.

Appendix 2: Request for Approval of Human Subjects Research to the University of Malta Research Ethics Committee and Acceptance of Research Project by Committee.

NB. The title in my request reflects my intentions from the outset to collect data for the three-timeframe longitudinal study. This includes the cross-sectional study one or the Malta study in this thesis.

Appendix 3: Letters Seeking Permission for Access to Research Sites and Acceptance by Relevant Authorities.

NB. The title in my request reflects my intentions from the outset to collect data for the three-timeframe longitudinal study. This includes the cross-sectional study one or the Malta study in this thesis.

Aston University

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Appendix 4: Acceptance to use Research Tools.

NB. The title in my request reflects my intentions from the outset to collect data for the three-timeframe longitudinal study. This includes the cross-sectional study one or the Malta study in this thesis.

Appendix 5: Preparation for Data Collection

Appendix 6: Report of Research Project Distributed to Third Parties

Report

HOW DO YOU FEEL ABOUT YOUR HOSPITAL JOB?

A longitudinal investigation into the moderating effects of support and control on the stressor to strain relationship in secondary health care

ASTON UNIVERSITY

DR SANDRA BUTTIGIEG

August 2005

Research Background

Patients, clients, relatives and policy makers, scrutinise hospital care for the quality of its delivery. Patients are more assertive and aware of their rights, indeed challenging the traditional relationships with the health care professionals. The socio-psychological impact of health care issues, coupled with high expectations by one and all, creates a stressful climate on health care providers. On the other hand, the well-being of these professionals is crucial to ensure effective health care delivery. This is even more so when there is evidence that shows that health care staff are amongst the most susceptible to stress.

Research Question

This study attempts at identifying organisational factors that management may adopt as practices to improve hospitals' social environment. In this context, I propose the following research question: *To what extent do leadership support, co-worker support, and decision latitude control moderate the work stressor – strain relationship in secondary health care?*

Research Process

WHAT IS THIS SURVEY?

The Survey is ***a three-timeframe longitudinal study*** produced with the help of researchers at Aston Business School, Aston University, Birmingham, UK. This survey is ***a population study*** targeted at ***all the health care professionals employed at St Luke's Hospital*** and seeks the views about the hospital units wards as well as the hospital job. The overall aim is to gather information about the work stressors the health care professionals are exposed to and what can be done to help to improve their working lives and contribute towards the provision of better care for patients.

WHAT IS COVERED IN THIS SURVEY?

The questionnaire consists of six sections, namely -

- **Section 1:** Seeks the views regarding the current hospital department unit ward where the participants work
- **Section 2:** Seeks the views about the hospital job and feelings towards the job
- **Section 3:** Asks questions on the participants' well-being
- **Section 4:** Seeks the participants' views about the proposed move to the new hospital
- **Section 5:** Seeks some details about work-life balance at the hospital
- **Section 6:** Seeks some biographical details to enable comparison between the views of different members of staff

WHO WILL SEE THE ANSWERS?

The information you give is **totally confidential.** The results of the research will be **completely anonymous** and **no one will have access to responses** nor will it be published in any way where the responses of particular units wards or individuals may be identified. It is our hope that the findings will inform policy making in hospital settings.

HOW CAN ONE FILL IN THIS SURVEY?

Most statements ask the participant to indicate *the degree or extent of your view* by marking the right box on a predetermined scale which best reflects their opinion. *Only one box for each question or statement should be marked.* For example in the following statement, one would mark the box **Agree** if the participant "agrees" with the statement that as a team "We all influence each other"

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
We all influence each other	☐	☐	☐	☒	☐

Once the questionnaire is completed, the participant is asked to **deposit it in the collection box** that will be **available in the unit/ward**. The participants will be asked to complete it for the current unit/ward, or the unit/ward, they mostly identify themselves with. If one work across two or more units/ wards in the hospital, the participant is asked to deposit the answer **in** the collection box in the unit/ward where s/he spends most of his/her time. There will be a **survey co-ordinator in each ward/unit**, to **help with the collection of the completed questionnaire.** If there are any questions about this research, the participants are invited to contact me as the main researcher.

Data Collection

As part of the population three-timeframe longitudinal study, we will start data collection in October 2005 with 6-month intervals between time 1 and 2 and between 2 and 3. Therefore, we intend to finish data collection by October 2006. As mentioned earlier, we will be helped by survey co-ordinators in various units so as to ensure the smooth running of the survey. Additionally, we will be using secure collection "ballot-like" boxes to improve response and ensure confidentiality.

So as to get a better response rate, we have also obtained institutional approval from the Rector of the University of Malta to organise a lottery draw for those who successfully complete the survey three times. This gives us the possibility to obtain a permit from the National Department of Public Lotto to organise this according to legal requirements.

TIMESCALE

Year	2005							2006											
Month	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Data Collection																			
Pilot Study																			
1st distribution of survey																			
2nd distribution of survey																			
3rd distribution of survey																			

Benefits

FEEDBACK

- **Organizational Feedback**

  A report describing the main findings will be available to: -

  1. The management of St Luke's Hospital
  2. All participating departments/units/wards
  3. All healthcare professional associations and/or organizations
  4. Trade unions

- **Individual Feedback**

  All participants will receive a report of the main findings on request.

CONTRIBUTION TO KNOWLEDGE

- **Organizational**

  The hospital organizational context and structure determines the work environment in which health care professionals provide the much needed secondary and tertiary health care. An improvement in the human resource practices may improve the working life of the health care professional. These developments are likely to improve performance and consequently the quality of care provided to our patients.

- **Department/units/wards**

  At departmental and unit level, the study aims at improving our understanding of work stressors that health care professionals are exposed to and identify strains that these health care professionals develop in their place of work. The measurement of strain will be taken both from a negative perspective such as burnout as well as from a positive perspective such as job satisfaction and job engagement.

- **Individual**

  The study aims at providing the individual health care professionals with evidenced-based recommendations on human resource practices and work methods that may help to buffer them from the work stressors that they are exposed to. Furthermore these recommendations may result in a significant improvement in the hospital work environment that may positively impact on employee well-being, job satisfaction and job engagement.

The Researcher: Dr Sandra Buttigieg

QUALIFICATIONS:

MD (University of Malta, 1987)
MSc (Public Health) (University of Malta, 1997)
MBA (Executive) (University of Malta, 2002) *Cum Laude*

RESEARCH INTERESTS:

- Work stressors and strains
- Leadership
- Team working
- Social support
- Decision making

CONTACT DETAILS:

- Telephone: (00356) 21 244977
- Mobile phone: 79424403
- Fax: (00356) 21 244970
- E-mail: sandra.buttigieg@um.edu.mt

Appendix 7: Approval from Department of Public Lotto for Official Draw of Sponsored Prizes

DIPARTIMENT TAL-LOTTU PUBBLIKU

DEPARTMENT OF PUBLIC LOTTO

OLS/31/94

Our Ref: ....

16th August 2005

17 AUG 2005

Dr Sandra Buttigieg
Director,
University of Malta
Institute of Health Care
G'Mangia

Dear Dr Buttigieg

D.P.L. PERMIT No. 83/2005

Reference is made to your letter dated 10th August 2005 wherein you requested some changes to the above permit.

This is to inform you that the Authority has approved your request to increase the prize structure subject to the following revised conditions:

b. that, the Grantees undertake to award the following prizes;

1st Prize:	2 Air Tickets to Innsbruck/Britannia Tours	Lm150.00
2nd Prize:	Air Ticket/NSTS	Lm110.00
3rd Prize:	Weekend Break for 2 pers/Riu Hotels & Resorts	Lm 70.00
4th Prize:	Gift voucher/Technoline	Lm 59.00
5th Prize:	MMS Phone & Connection/Go mobile	Lm 54.00
6th Prize:	Fragrance or gift pack/Chemimart	Lm 50.00
7th Prize:	Gift voucher/Ramiline	Lm 50.00
8th Prize:	Gift voucher/Unicare Ltd	Lm 50.00
9th Prize:	Session for 2 pers at Spa Sante/Fortina Resort	Lm 32.00
10th Prize:	1 month membership at Cynergi	Lm 31.00
11th Prize:	10 Bowling Tickets/Eden's Superbowl	Lm 27.50
12th Prize:	Book Token/Agenda Bookshop	Lm 20.00
13th Prize:	Book Token/Agius & Agius books	Lm 20.00
14th Prize:	10 Imax Theatre Cinema Tickets	Lm 20.00
15th Prize:	Medical Dictionary/Kekoo Modi	Lm 19.00
16th Prize:	Book Ends/Drug Sales Ltd	Lm 14.00
17th Prize:	3 Bottles of Wine/RedOctober Ltd	Lm 12.00
18th Prize:	Perfumary Pack/AM Mangion ltd	Lm 13.00
19h Prize:	Stetoscope/Associated Equipment	Lm 10.00

to the participants whose eligible questionnaires are drawn at random from a drum containing all the questionnaires participating in the draw;

c. that the total value of the prizes to be awarded shall not exceed **Lm811.50,0.**

Stephen Vella
F/A/Director (Lotteries)

MINISTERU TAL-FINANZI – MINISTRY OF FINANCE

Appendix 8: Team Selection Based on Dawson's Selection Criterion (2003)

Team selection: Dawson's selection rate (2003)* is used as a criterion to select which teams should be included in the sample. The selection rate (N-n/N'n) is a function of unit response rate and unit size. It is a measure, based on minimising standard error of the mean. It is derived from Monte Carlo Simulations, and assesses the accurateness of incomplete unit-level data in predicting true scores. The cut-off point is a selection rate of 0.32, which is the point, at which the correlation between scores from incomplete data and true scores is 0.95 or higher. * Dawson, J. F. (2003); Richter, West, van Dick, and Dawson (2006).

	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
1.	001	11	10	0.84	0.84	20	55%	50%	0.04	0.05
2.	002	13	12	0.99	1.83	26	50%	46%	0.04	0.04
3.	003	13	12	0.99	2.83	22	59%	55%	0.03	0.04
4.	004	13	13	0.99	3.82	19	68%	68%	0.02	0.02
5.	005	8	7	0.61	4.43	18	44%	39%	0.07	0.09
6.	006	3	2	0.23	4.66	21	14%	10%	0.29	0.45
7.	007	8	7	0.61	5.27	16	50%	44%	0.06	0.08
8.	008	13	12	0.99	6.26	20	65%	60%	0.03	0.03
9.	009	5	5	0.38	6.65	19	26%	26%	0.15	0.15
10.	009A01	4	3	0.31	6.95	10	40%	30%	0.15	0.23
11.	009A03	4	4	0.31	7.26	15	27%	27%	0.18	0.18
12.	009A08	2	2	0.15	7.41	4	50%	50%	0.25	0.25
13.	009A12	3	3	0.23	7.64	13	23%	23%	0.26	0.26
14.	009A13	5	4	0.38	8.02	15	33%	27%	0.13	0.18
15.	009A16	3	3	0.23	8.25	6	50%	50%	0.17	0.17
16.	009A17	4	4	0.31	8.56	9	44%	44%	0.14	0.14
17.	009A20	7	6	0.53	9.09	12	58%	50%	0.06	0.08
18.	009B	1	1	0.08	9.17	1	100%	100%	0.00	0.00
	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
19.	010	12	11	0.92	10.08	13	92%	85%	0.01	0.01
20.	011	7	6	0.53	10.62	13	54%	46%	0.07	0.09
21.	012	8	7	0.61	11.23	17	47%	41%	0.07	0.08
22.	013	9	9	0.69	11.92	13	69%	69%	0.03	0.03
23.	014	6	5	0.46	12.38	12	50%	42%	0.08	0.12
24.	015	9	8	0.69	13.06	10	90%	80%	0.01	0.03
25.	016	15	14	1.15	14.21	20	75%	70%	0.02	0.02
26.	016A01	3	3	0.23	14.44	6	50%	50%	0.17	0.17
27.	016A03	1	1	0.08	14.51	7	14%	14%	0.86	0.86
28.	016A04	3	3	0.23	14.74	6	50%	50%	0.17	0.17
29.	016A05	3	2	0.23	14.97	6	50%	33%	0.17	0.33
30.	016A06	3	3	0.23	15.20	7	43%	43%	0.19	0.19
31.	016A07La	2	2	0.15	15.36	7	29%	29%	0.36	0.36
32.	016A08	1	1	0.08	15.43	7	14%	14%	0.86	0.86
33.	016A09	1	1	0.08	15.51	7	14%	14%	0.86	0.86
34.	016A12	1	1	0.08	15.58	4	25%	25%	0.75	0.75
35.	016A15	2	2	0.15	15.74	4	50%	50%	0.25	0.25
36.	016A16	1	1	0.08	15.81	4	25%	25%	0.75	0.75
37.	016A17	2	1	0.15	15.97	9	22%	11%	0.39	0.89
	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
38.	017	12	12	0.92	16.88	16	75%	75%	0.02	0.02
39.	018	9	9	0.69	17.57	13	69%	69%	0.03	0.03
40.	019	8	8	0.61	18.18	12	67%	67%	0.04	0.04
41.	020	6	6	0.46	18.64	10	60%	60%	0.07	0.07
42.	020A	3	3	0.23	18.87	14	21%	21%	0.26	0.26
43.	020Abe	4	4	0.31	19.17	5	80%	80%	0.05	0.05
44.	020Asc	2	2	0.15	19.33	5	40%	40%	0.30	0.30
45.	021	11	11	0.84	20.17	14	79%	79%	0.02	0.02
46.	022	14	14	1.07	21.24	19	74%	74%	0.02	0.02
47.	023	8	8	0.61	21.85	9	89%	89%	0.01	0.01
48.	024	10	10	0.76	22.61	22	45%	45%	0.05	0.05
49.	025	9	9	0.69	23.30	13	69%	69%	0.03	0.03
50.	026A	30	30	2.29	25.59	39	77%	77%	0.01	0.01
51.	026B	6	6	0.46	26.05	10	60%	60%	0.07	0.07
52.	027	20	21	1.53	27.58	37	54%	57%	0.02	0.02
53.	028	6	6	0.46	28.04	10	60%	60%	0.07	0.07
54.	028A	6	6	0.46	28.50	13	46%	46%	0.09	0.09
55.	028B	5	5	0.38	28.88	5	100%	100%	0.00	0.00

	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
56.	029A	35	35	2.67	31.55	39	90%	90%	0.00	0.00
57.	029B	15	15	1.15	32.70	22	68%	68%	0.02	0.02
58.	029C	3	3	0.23	32.93	3	100%	100%	0.00	0.00
59.	030	25	25	1.91	34.84	31	81%	81%	0.01	0.01
60.	031	10	10	0.76	35.60	22	45%	45%	0.05	0.05
61.	032	10	10	0.76	36.36	12	83%	83%	0.02	0.02
62.	033	16	16	1.22	37.59	18	89%	89%	0.01	0.01
63.	035	4	4	0.31	37.89	7	57%	57%	0.11	0.11
64.	036	6	6	0.46	38.35	11	55%	55%	0.08	0.08
65.	037	7	7	0.53	38.88	10	70%	70%	0.04	0.04
66.	037A	5	5	0.38	39.27	13	38%	38%	0.12	0.12
67.	038	8	8	0.61	39.88	15	53%	53%	0.06	0.06
68.	039	18	18	1.38	41.25	18	100%	100%	0.00	0.00
69.	040	10	10	0.76	42.02	14	71%	71%	0.03	0.03
70.	041	27	27	2.06	44.08	29	93%	93%	0.00	0.00
71.	042	33	33	2.52	46.60	41	80%	80%	0.01	0.01
72.	043	8	8	0.61	47.21	12	67%	67%	0.04	0.04
73.	044	10	10	0.76	47.98	10	100%	100%	0.00	0.00
74.	045	9	9	0.69	48.66	15	60%	60%	0.04	0.04

	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
75.	046	18	17	1.38	50.04	24	75%	71%	0.01	0.02
76.	047	5	5	0.38	50.42	6	83%	83%	0.03	0.03
77.	048	20	20	1.53	51.95	54	37%	37%	0.03	0.03
78.	049	16	16	1.22	53.17	18	89%	89%	0.01	0.01
79.	050	16	16	1.22	54.39	26	62%	62%	0.02	0.02
80.	051	32	32	2.44	56.84	59	54%	54%	0.01	0.01
81.	052	19	19	1.45	58.29	54	35%	35%	0.03	0.03
82.	053	27	27	2.06	60.35	40	68%	68%	0.01	0.01
83.	054A	10	10	0.76	61.12	14	71%	71%	0.03	0.03
84.	054B	5	5	0.38	61.50	5	100%	100%	0.00	0.00
85.	054C	7	7	0.53	62.03	10	70%	70%	0.04	0.04
86.	054D	5	5	0.38	62.41	6	83%	83%	0.03	0.03
87.	055A	6	6	0.46	62.87	15	40%	40%	0.10	0.10
88.	055B	6	6	0.46	63.33	7	86%	86%	0.02	0.02
89.	056	4	4	0.31	63.64	9	44%	44%	0.14	0.14
90.	057	22	22	1.68	65.32	29	76%	76%	0.01	0.01
91.	058	14	14	1.07	66.39	25	56%	56%	0.03	0.03
92.	059	12	12	0.92	67.30	12	100%	100%	0.00	0.00
93.	060	9	9	0.69	67.99	12	75%	75%	0.03	0.03

	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
94.	061A	7	7	0.53	68.53	10	70%	70%	0.04	0.04
95.	061B	5	5	0.38	68.91	10	50%	50%	0.10	0.10
96.	061C	7	7	0.53	69.44	10	70%	70%	0.04	0.04
97.	061D	8	8	0.61	70.05	10	80%	80%	0.03	0.03
98.	061O	5	5	0.38	70.44	15	33%	33%	0.13	0.13
99.	062A	13	13	0.99	71.43	36	36%	36%	0.05	0.05
100	062B01	5	5	0.40	71.80	9	56%	56%	0.09	0.09
101.	062B02	4	4	0.30	72.10	10	40%	40%	0.15	0.15
102	062B03	4	4	0.30	72.40	9	44%	44%	0.14	0.14
103.	062B04	4	4	0.30	72.70	9	44%	44%	0.14	0.14
104	062B05	9	8	0.70	73.40	16	56%	50%	0.05	0.06
105	063A	4	3	0.30	73.70	15	27%	20%	0.18	0.27
106.	063B	6	6	0.50	74.20	18	33%	33%	0.11	0.11
107.	063C	6	6	0.50	74.60	7	86%	86%	0.02	0.02
108.	063D	13	12	1.00	75.60	18	72%	67%	0.02	0.03
109.	063E	4	3	0.30	75.90	15	27%	20%	0.18	0.27
110.	063EI	2	2	0.20	76.10	4	50%	50%	0.25	0.25
111	063H	8	8	0.60	76.70	11	73%	73%	0.03	0.03

	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
112.	063Hi	1	1	0.10	76.80	1	100%	100%	0.00	0.00
113.	063Hii	2	1	0.20	76.90	2	100%	50%	0.00	0.50
114.	063J	3	2	0.20	77.20	6	50%	33%	0.17	0.33
115.	063M	5	5	0.40	77.50	6	83%	83%	0.03	0.03
116.	063O	1	0	0.10	77.60	8	13%	0%	0.88	#DIV/0!
117.	063P	14	13	1.10	78.70	20	70%	65%	0.02	0.03
118.	064A	49	49	3.70	82.40	77	64%	64%	0.01	0.01
119.	064B	6	5	0.50	82.90	14	43%	36%	0.10	0.13
120.	065	8	7	0.60	83.50	9	89%	78%	0.01	0.03
121.	066	2	2	0.20	83.70	4	50%	50%	0.25	0.25
122.	070	4	3	0.30	84.00	7	57%	43%	0.11	0.19
123.	071A	3	2	0.20	84.20	3	100%	67%	0.00	0.17
124.	071B	2	1	0.20	84.30	2	100%	50%	0.00	0.50
125.	071C	7	6	0.50	84.90	10	70%	60%	0.04	0.07
126.	071D	3	3	0.20	85.10	7	43%	43%	0.19	0.19
127.	071G	13	12	1.00	86.10	17	76%	71%	0.02	0.02
128.	073	3	2	0.20	86.30	5	60%	40%	0.13	0.30
129.	074	1	1	0.10	86.40	2	50%	50%	0.50	0.50
130.	075A	6	5	0.50	86.90	8	75%	63%	0.04	0.08
	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
131.	077	3	2	0.20	87.10	3	100%	67%	0.00	0.17
132.	078	4	3	0.30	87.40	4	100%	75%	0.00	0.08
133.	079	14	13	1.10	88.50	19	74%	68%	0.02	0.02
134.	080	5	5	0.40	88.80	6	83%	83%	0.03	0.03
135.	081	3	2	0.20	89.10	6	50%	33%	0.17	0.33
136.	082	5	5	0.40	89.50	5	100%	100%	0.00	0.00
137.	083	11	10	0.80	90.30	16	69%	63%	0.03	0.04
138.	085A	4	4	0.30	90.60	5	80%	80%	0.05	0.05
139.	085B	3	2	0.20	90.80	3	100%	67%	0.00	0.17
140.	087	3	2	0.20	91.10	4	75%	50%	0.08	0.25
141.	088	7	6	0.50	91.60	7	100%	86%	0.00	0.02
142.	089	8	8	0.60	92.20	28	29%	29%	0.09	0.09
143.	095	9	8	0.70	92.90	10	90%	80%	0.01	0.03
144.	095B	2	1	0.20	93.00	2	100%	50%	0.00	0.50
145.	097	12	11	0.90	94.00	12	100%	92%	0.00	0.01
146.	098	3	3	0.20	94.20	3	100%	100%	0.00	0.00
147.	099A	1	1	0.10	94.30	1	100%	100%	0.00	0.00
	Unit Code Number	Frequency with Leader	Frequency without Leader	Percent from total respondents with leader	Cumulative Percent with Leader	Total Population in unit	Percentage respondents from each unit with Leader	Percentage respondents from each unit without Leader	N-n/N'n Team with Leader	N-n/N'n Team without Leader
148.	099C	14	14	1.10	95.30	19	74%	74%	0.02	0.02
149.	099D	2	2	0.20	95.50	4	50%	50%	0.25	0.25
150.	100	3	3	0.20	95.70	5	60%	60%	0.13	0.13
151.	101	3	2	0.20	96.00	4	75%	50%	0.08	0.25
152.	102	5	5	0.40	96.30	6	83%	83%	0.03	0.03
153.	103	31	31	2.40	98.70	37	84%	84%	0.01	0.01
154.	104	4	3	0.30	99.00	5	80%	60%	0.05	0.13
155.	107	5	4	0.40	99.40	7	71%	57%	0.06	0.11
156.	108	4	3	0.30	99.70	5	80%	60%	0.05	0.13
157.	110	4	4	0.30	100.00	5	80%	80%	0.05	0.05
	Total	**1184**	**1137**	**100.00**	**100.00**	**1893.00**	**63%**	**60%**		
	Reliever pool									
	Do not qualify as selection rate is > 0.32									

Therefore, out of 157 units, unit 103 will not be included as this is the reliever pool, whose members work in different units according to need. Twenty other units have as selection rate above 0.32, or have only two members in unit, and therefore are excluded. The TOTAL NUMBER of ELIGIBLE UNITS is 136.

Appendix 9: External Rating Tool for Hospital Unit Performance

EXTERNAL RATING OF HOSPITAL UNIT/WARD

Sandra Buttigieg
Work & Organisational Psychology Group
Aston Business School
Aston University

PLEASE CIRCLE THE ONE NUMBER FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR OPINION ABOUT IT.

	To what extent does the hospital unit/ward........................carry out the following?	NOT AT ALL				TO A GREAT EXTENT
1.	Effectively provides patients and relatives with information on hospital services?	1	2	3	4	5
2.	Effectively provides patients and relatives with information on how ward/unit functions?	1	2	3	4	5
3.	Effectively provides patients and relatives with information on the medical condition that required admission?	1	2	3	4	5
4.	Effectively implements procedures for dealing with patients' questions, comments, suggestions and complaints?	1	2	3	4	5
5.	Effectively maintains clinical competence in line with current patient needs?	1	2	3	4	5
6.	Effectively audits the clinical practice of the unit/ward?	1	2	3	4	5
7.	Effectively sets protocols which are agreed and implemented by members of staff in the unit/ward?	1	2	3	4	5
8.	Shows effective commitment to the personal and professional development of all members of staff in the unit/ward?	1	2	3	4	5
9.	Members of staff understand and value the roles and responsibilities of fellow members of staff?	1	2	3	4	5
10.	Effectively implements a clear strategy for communication (e.g. regular meetings, message systems, frequent face-to-face sharing of information)?	1	2	3	4	5
11.	Effectively profiles the unit/ward patients' needs?	1	2	3	4	5
12.	Effectively reviews and adjusts skill mix in accordance with the identified unit/ward patients' needs?	1	2	3	4	5
13.	Effectively collaborates with the management of the hospital?	1	2	3	4	5
14.	Effectively collaborates with other departments, units and wards in the hospital?	1	2	3	4	5
15.	Makes effective use of the resources allocated to it?	1	2	3	4	5
16.	Effectively implements good practice recommendations that are issued by the Department of Health or hospital management?	1	2	3	4	5
17.	Effectively concentrates on the achievement of optimal patient outcomes?	1	2	3	4	5

THANK YOU FOR ANSWERING THE ABOVE QUESTIONS AND FOR YOUR SUPPORT IN THE STUDY

Appendix 10: Applying the Nebeker & Hanges (Personal Communication, October 19, 2006) **Rater Correction Method** in SPSS, by J. F. Dawson (Personal Communication, October 25, 2006)

Nebeker & Hanges (under review) propose a method of correcting for rater bias using criterion scaling. Although it is a fairly straightforward approach, it requires several steps in SPSS to apply the corrections to a data set:

(1) Calculate criterion scale(s)
(2) Create rater dummy variables
(3) Run regression analysis
(4) Apply corrections
(5) Aggregate to target levels

To describe these steps, I illustrate the procedures using one rating variable, SCORE, which was given to each of 30 targets (variable name TARGET) by a subset of 10 raters (variable name RATER). However, it can be applied to any number of rating variables, and with any number of targets and raters (as long as there are substantially more targets than raters).

For the sake of this example I will use a fictional data set, stored as 'c:/ratingdata.sav'. Before starting, ensure this sorted by target (syntax: `sort cases by TARGET.`).

(1) Calculate criterion scale(s)

The criterion scale is simply the mean of the raw ratings for each target in the sample. Therefore, this step involves aggregating the data to the target level, and matching this back with the original data. The aggregation step can be completed with the following syntax:

```
aggregate outfile='c:/temp/criterion.sav'
 /break=TARGET
 /SCORE_M = mean(SCORE).
exe.
```

Note that the criterion scale is here called SCORE_M. This can then be matched with the original data using a command such as:

```
match files /file='c:/ratingdata.sav'
 /table='c:/temp/criterion.sav'
 /by target.
exe.
```

(2) Create rater dummy variables

This is a straightforward step to accomplish using syntax. Note that, although not every rater will need a dummy variable for the regression, it is usually worth calculating dummy variables for all raters.

```
recode RATER (1=1)(else=0) into RATER1.
recode RATER (2=1)(else=0) into RATER2.
recode RATER (3=1)(else=0) into RATER3.
recode RATER (4=1)(else=0) into RATER4.
recode RATER (5=1)(else=0) into RATER5.
recode RATER (6=1)(else=0) into RATER6.
recode RATER (7=1)(else=0) into RATER7.
recode RATER (8=1)(else=0) into RATER8.
recode RATER (9=1)(else=0) into RATER9.
recode RATER (10=1)(else=0) into RATER10.
exe.
```

(3) Run regression analysis

The regression analysis requires SCORE as the dependent variable, but the criterion scale and all but one-rater dummy variables as independent variables.

Note that the regression will not run if **all** dummy variables are included; the choice of which to leave out is not very important, but note that all scores will be adjusted to the metric of the rater whose dummy variable **is** left out of the regression analysis. Therefore, if we wish to adjust all scores to the metric of rater 1, we would include dummy variables for raters 2 to 10.

```
regression /dependent = SCORE
 /method=enter SCORE_M RATER2 RATER3 RATER4 RATER5 RATER6 RATER7 RATER8
RATER9 RATER10.
```

(4) Apply corrections

To apply the necessary corrections, syntax should be written to include results of the regression analysis. Briefly, this should be in the form of the following syntax:

```
if (RATER = 1) SCORE_A = SCORE.
if (RATER = 2) SCORE_A = SCORE - B2 - C.
if (RATER = 3) SCORE_A = SCORE - B3 - C.
if (RATER = 4) SCORE_A = SCORE - B4 - C.
if (RATER = 5) SCORE_A = SCORE - B5 - C.
if (RATER = 6) SCORE_A = SCORE - B6 - C.
if (RATER = 7) SCORE_A = SCORE - B7 - C.
if (RATER = 8) SCORE_A = SCORE - B8 - C.
if (RATER = 9) SCORE_A = SCORE - B9 - C.
if (RATER = 10) SCORE_A = SCORE - B10 - C.
exe.
```

Here, SCORE_A is the name I have given to the adjusted score; B2, B3 etc. are the **unstandardised** regression coefficients associated with RATER2, RATER3 etc. in the regression output, and C is the constant (intercept) from the regression output. So one line of this might look, for example, like:

```
if (RATER = 2) SCORE_A = SCORE - 1.253 + 0.207.
```

(This would be the case if the coefficient of RATER2 was 1.253, and the constant was -0.207.)

(5) Aggregate to target levels

Finally, the data need to be aggregated to the target level to get the "overall" (combined, adjusted) rating for each target. This can be done using simple syntax similar to that used in step 1:

```
aggregate outfile='c:/combinedratings.sav'
 /break=TARGET
 /SCORE_A = mean(SCORE_A).
exe.
```

Appendix 11: Hierarchical Organisational Model – Stratified Systems Theory

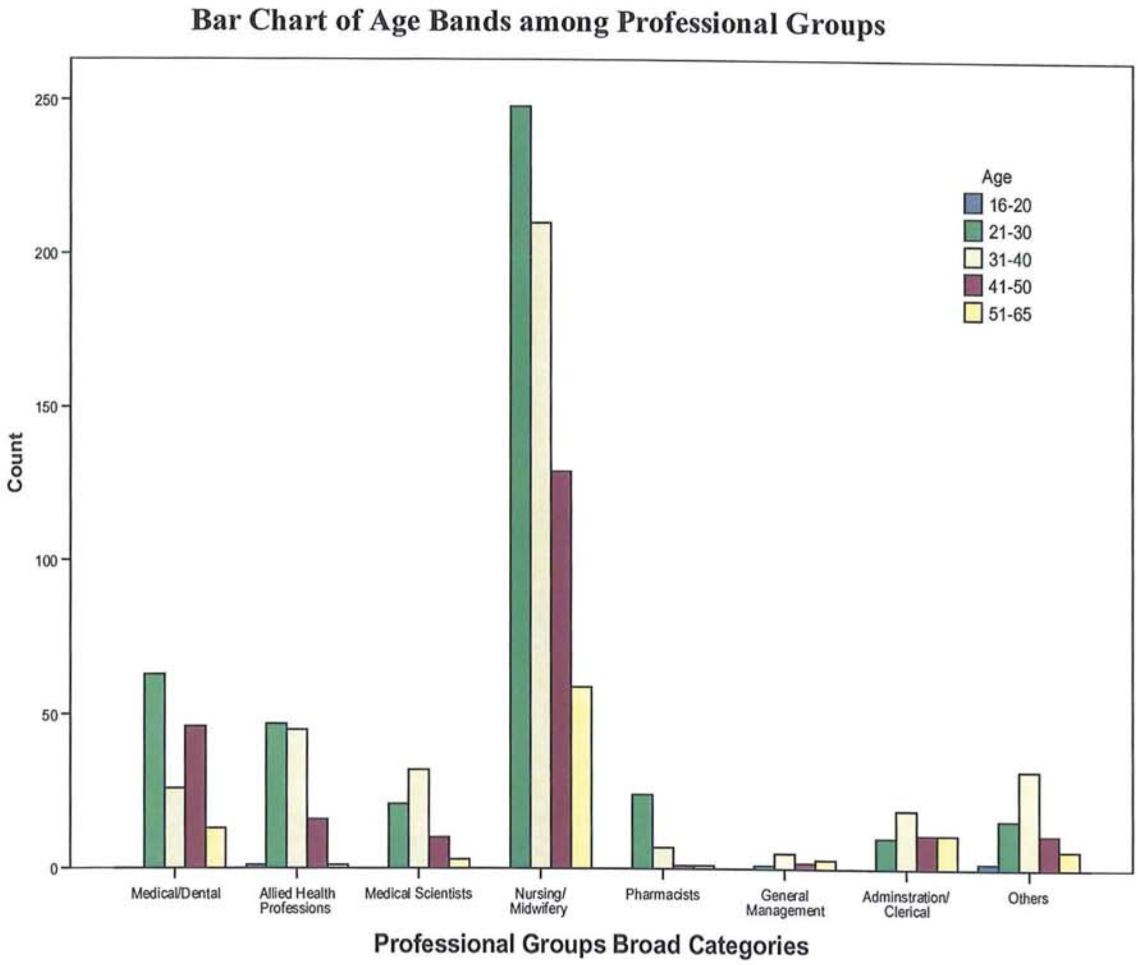
Stratum	Time Span	Functional Domain
VII (Corporation) VI (Group)	20 years 10 years	Systems Domain —Operates in a nearly unbounded world environment, identifies feasible futures, develops consensus of specific futures to create, and builds required resource bases to create whole systems that can function in the environment. Creates a corporate culture and value system compatible with social values and culture to serve as a basis for organizational policies and climate.
V (Company) IV (Division)	5 years 2 years	Organizational Domain —Individuals at stratum V operate bounded open systems thus created, assisted by individuals at stratum IV in managing adaptation of those systems within the environment by modification/maintenance/fine tuning of internal processes and climate and by oversight of subsystems.
III (Department) II (Section; I (Shop Floor)	1 year 3 months	Production Domain —Runs face-to-face (mutual recognition or mutual knowledge) sub-systems units, or groups engaged in specific differentiated functions but interdependent with other units or groups, limited by context and boundaries set within the larger system.

Source: Jacobs and Jacques, *Leadership in Complex Systems, Human Productivity Enhancement*, Praeger Publishers, 1987, p.16.

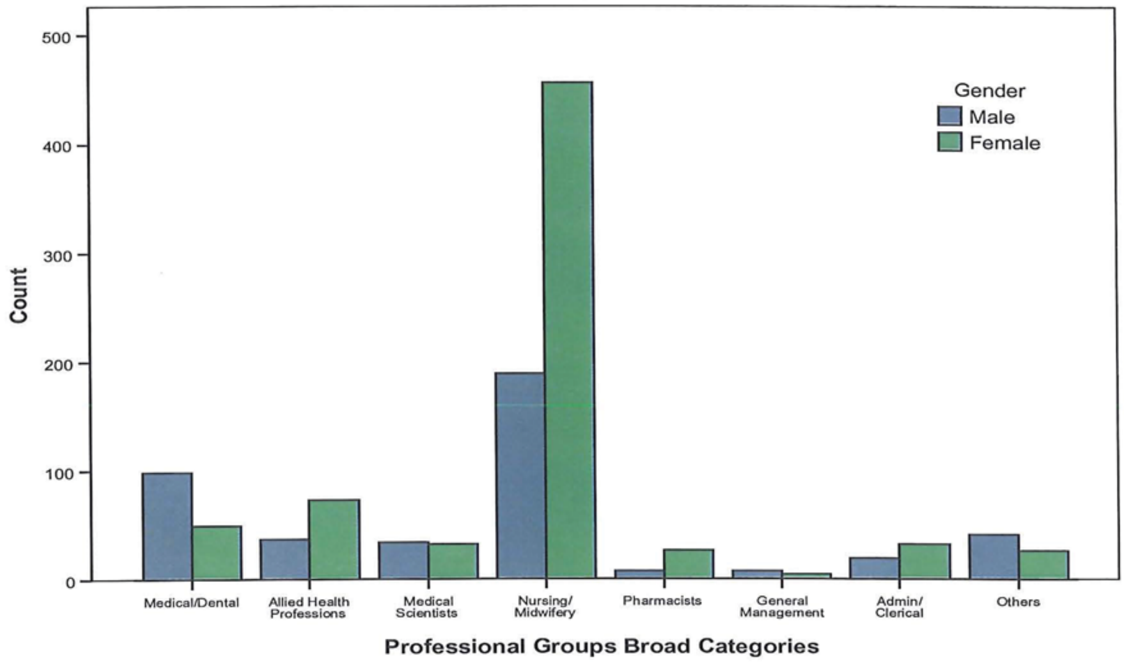
Appendix 12: Chronology in Leadership Theory (Northouse, 2001)

Leadership Theory	**Chronology**	**Description**
"Great Man" Theories	Thomas Carlyle (1847)	Leaders are born with innate qualities and are destined to lead. Only those men who are blessed with "heroic" qualities could ever emerge as leaders.
"Trait" Theories	From the turn of the twentieth century until 1940s.	Natural born leaders possess certain physical traits and personality characteristics that distinguish them from non-leaders.
	Renewed interest by House and Podsakoff in 1994.	Traits relate to perceptions of leadership by subordinates but fail to distinguish effective from ineffective leaders
In the late 1940's, the trait approach was challenged by an influential review by Stogdill (1948), who questioned the universality of leadership traits across a variety of situations.		
"Behaviourist" Theories	Ohio State University Leadership Studies in 1948 under the direction of Ralph Stogdill	Different types of behaviour are observed and categorised as styles of leadership.
"Contingency" Theory	The most widely recognised was developed by Fiedler in 1964.	Effective leadership is contingent on matching a leader's style to the right setting.
"Situational Leadership"	Developed by Hersey and Blanchard in 1969.	This approach views leadership as specific to the situation, which is to say that some situations demand an autocratic approach, whereas a more participative approach may be more appropriate in other situations.
"Path-Goal" Theory	First appeared in the leadership literature in the early 1970's by Evans and House.	This theory aims at enhancing employee performance and satisfaction by focusing on motivation.
Leader-Member Exchange Theory	First described by Dansereau, Graen, and Haga in 1975.	Conceptualises leadership as a process that is centered in the interactions between leaders and followers.
"Transformational" Theory	James MacGregor Burns in 1978.	Leadership that changes and transforms followers.

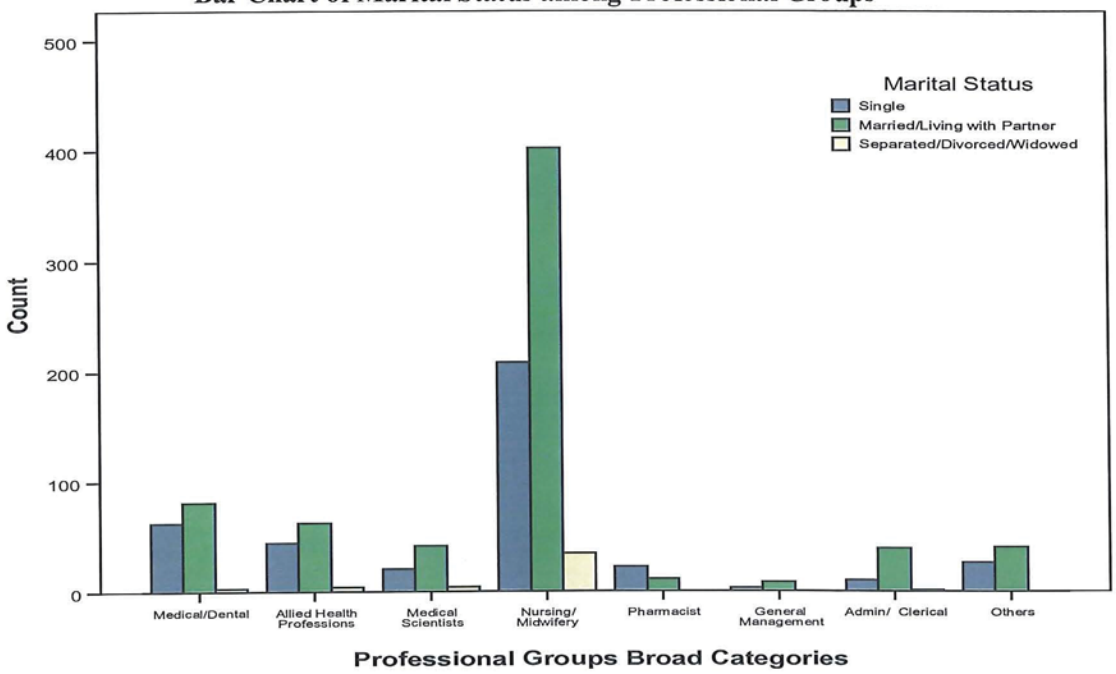
Appendix 13: The Age, Gender, and Marital Status of the Various Professional Groups in Study Two



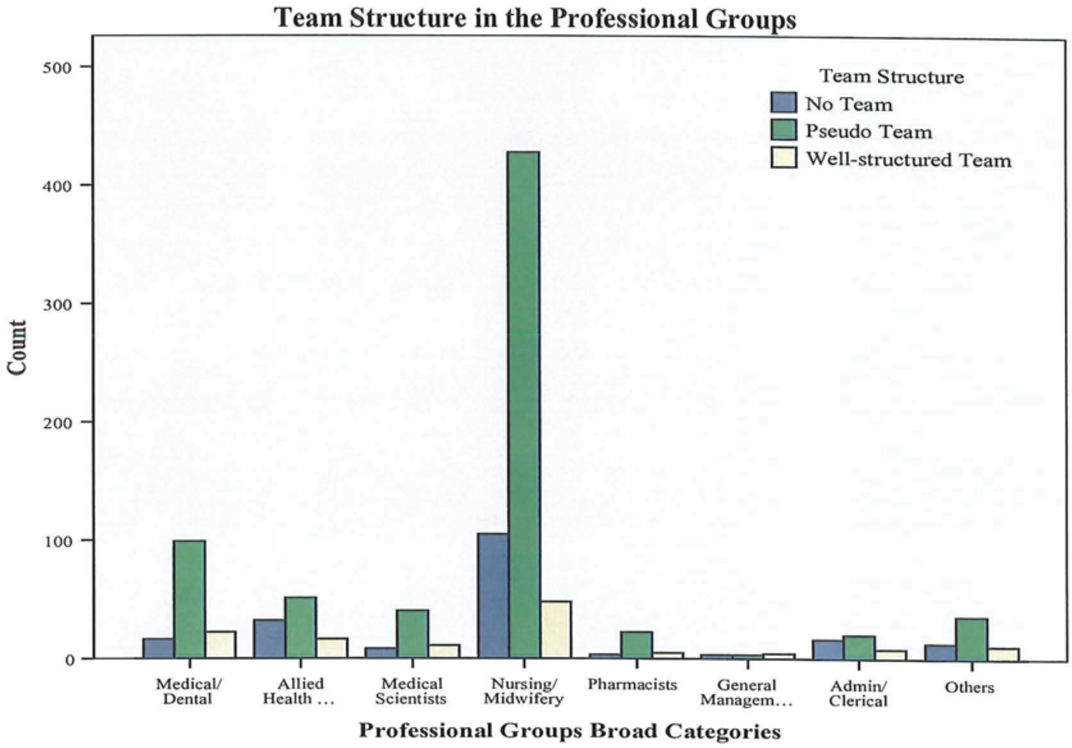
Bar Chart of Gender among Professional Groups



Bar Chart of Marital Status among Professional Groups



Appendix 14: Team structure By Professional Group in Study Two



Professional Group Profile of Maltese Sample Working in Well-Structured Teams vs. Those in Pseudo Teams/Not Working in Teams

		Team Structure		
		No Team	Pseudo Team	Real Team
Professional Groups Broad Categories	Medical/Dental	11.7%	72.3%	16.1%
	Allied Health Professions	32.3%	51.5%	16.2%
	Medical Scientists	13.6%	67.8%	18.6%
	Nursing/Midwifery	18.1%	73.7%	8.3%
	Pharmacists	10.0%	73.3%	16.7%
	General Management	30.0%	30.0%	40.0%
	Administration/Clerical	36.4%	45.5%	18.2%
	Others	21.7%	60.0%	18.3%
Total		19.2%	68.5%	12.3%

Appendix 15: The Questionnaire and Accompanying Poster

Aston University

Illustration removed for copyright restrictions

Draw of prizes and study approved by the University of Malta

FOR OFFICIAL USE ONLY						

Unique identification number will be kept separate from your name

ASTON UNIVERSITY

SURVEY

How Do You Feel About Your Hospital Job?

Unique Identification Number

What is the purpose of this survey?

- It is a survey of your views about the hospital where you work. This is not a test. There are **no right or wrong answers.** We want to know **your personal views** on the issues raised in the questionnaire.

What is covered in this survey?

The questionnaire consists of six sections:

- **Section 1:** Seeks your views regarding the current hospital unit/ward where you work
- **Section 2:** Seeks your views about your job and feelings towards your job
- **Section 3:** Seeks your feelings about your well-being
- **Section 4:** Seeks your views about the move to the NEW Hospital
- **Section 5:** Seeks some details about work-life balance at the Hospital
- **Section 6:** Seeks some biographical details to enable us to compare the views of different members of staff

Who will see my responses?

- The information you give is **totally confidential.** The results of the research will be **completely anonymous** and **no one except the researchers will have access to responses** nor will it be published in any way where the responses of particular units/wards or individuals could be identified.

How long will it take?

- The questionnaire will take about 30 minutes to complete.

How do I fill in this survey?

- Please read each question carefully and respond to the items as accurately as you can.
- Do not spend too long thinking about your responses to an item - usually your first reaction is the best one.
- Most statements ask you to indicate *the degree or extent of your view* by marking the right box on a predetermined scale which best reflects your opinion. *Always mark* ***one*** *box for each question or statement.*

For example in the following statement, you would mark the box **Agree** if you "agree" with the statement that as a team "We all influence each other".

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
We all influence each other	☐	☐	☐	☒	☐

- Once you have completed the questionnaire, please take a moment to check that you have answered **all the items** and **deposit it in the collection box** that will be **available in the unit/ward where you work.** Please complete it for your current unit/ward, or the unit/ward, you mostly identify yourself with.
- If you work **across two or more units/wards** in the hospital, **please deposit your answer in the collection box in the unit/ward, where you spend most of your time.**
- **If you have any questions about this research, my contact details are shown below.**

Dr Sandra Buttigieg
E-mail: sandra.buttigieg@um.edu.mt
Telephone Number: 21 244977

Kindly **complete** the questionnaire **within two weeks. Thank you for taking the time to fill in this survey.**

Aston University

SECTION 1 - Your Hospital Unit/Ward

The following items concern ***leadership clarity and style*** in your place of work. In this context, the place of work is the unit or ward or firm/shift that you identify yourself with.

1.1 To what extent is there an overall leader/co-ordinator in your unit?
Please *refer to the past 6 months* and *select one of the following options:*

a) There is a very clear leader/co-ordinator	☐	b) A number of people lead/co-ordinate the unit/ward/team	☐
c) There is no clear leader/co-ordinator	☐	d) There is conflict over who leads/co-ordinates the unit/ward/team	☐
e) We all have leadership/co-ordinator roles	☐		

1.2 To what extent do you agree with the following?
*Kindly keep in mind **the leader/manager of your work unit, or** if **you are the leader** of the unit, **your immediate superior,** when selecting your answers. Please indicate the extent to which you either agree or disagree with each statement and **refer to the past 6 months** when marking each statement.*

The leader ...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) Has a clear understanding of where we are going	☐	☐	☐	☐	☐
b) Has a clear sense of where he/she wants our unit to be in 5 years	☐	☐	☐	☐	☐
c) Has no idea where the organization is going	☐	☐	☐	☐	☐
d) Says things that make employees proud to be part of this organization	☐	☐	☐	☐	☐
e) Says positive things about the work unit	☐	☐	☐	☐	☐
f) Encourages people to see changing environments as situations full of opportunities	☐	☐	☐	☐	☐
g) Challenges me to think about old problems in new ways	☐	☐	☐	☐	☐
h) Has ideas that have forced me to rethink some things that I have never questioned before	☐	☐	☐	☐	☐
i) Has challenged me to rethink some of my basic assumptions about my work	☐	☐	☐	☐	☐
j) Considers my personal feelings before acting	☐	☐	☐	☐	☐
k) Behaves in a manner which is thoughtful of my personal needs	☐	☐	☐	☐	☐
l) Sees that the interests of employees are given due consideration	☐	☐	☐	☐	☐
m) Commends me when I do better than average job	☐	☐	☐	☐	☐
n) Acknowledges improvement in my quality of work	☐	☐	☐	☐	☐
o) Personally compliments me when I do outstanding work	☐	☐	☐	☐	☐

ASTON UNIVERSITY

1.3 *The following questions concern **your team** and relate to that group of people you work with most closely. When answering the questions, kindly keep in mind that **the team may be the unit/ward/shift/firm** you work in. Please **refer to the past 6 months** when answering questions.*

a) Do you work as part of a defined work team? Yes ☐ No ☐ *If **yes**, please answer **questions 1.3b to 1.7*** *If **no**, please proceed to **1.8***

b) How many **teams** do you work in? **one** ☐ **two** ☐ **three** ☐ **four** ☐ **More than four** ☐

*If your answer to Question **1.3b** is **more than one, please answer the following questions** in relation to the **main team** you work with, or the one you spend **the most time in.***

c) Does your team consist of? **One profession (Undisciplinary)** ☐ **Several professions (Multidisciplinary)** ☐

d) Does your team have clear objectives? **Yes** ☐ **No** ☐

e) Do you have to work closely with other team members to achieve the team's objectives? **Yes** ☐ **No** ☐

f) Are there different roles for team members within this team? **Yes** ☐ **No** ☐

g) Is your team recognised by others in the hospital unit or department as a clearly defined team? **Yes** ☐ **No** ☐

h) Does the team meet regularly to discuss its effectiveness and how it could be improved? **Yes** ☐ **No** ☐

i) How many people are there in your work group that you would consider being your team? 2-5 people ☐ 6-9 people ☐ 10-15 people ☐ more than 15 ☐

1.4 *The following statements concern **participation in the team, which you identify yourself with.** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement.*

In the team I work in:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) We have a *'we are in it together'* attitude	☐	☐	☐	☐	☐
b) People keep each other informed about work-related issues in the team	☐	☐	☐	☐	☐
c) People feel understood and accepted by each other	☐	☐	☐	☐	☐
d) There are real attempts to share information throughout the team	☐	☐	☐	☐	☐
e) There is a lot of give and take	☐	☐	☐	☐	☐
f) We keep in touch with each other as a team	☐	☐	☐	☐	☐

1.5 *The following statements concern* ***the support for new ideas in the team, which you identify yourself with.*** *Please refer to* ***the past 6 months*** *and indicate the extent to which you either agree or disagree with each statement.*	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) This team is always moving towards the development of new answers	☐	☐	☐	☐	☐
b) This team is open and responsive to change	☐	☐	☐	☐	☐
c) People in this team are always searching for fresh, new ways of looking at problems	☐	☐	☐	☐	☐
d) Members of the team provide and share resources to help in the application of new ideas	☐	☐	☐	☐	☐
e) Team members provide practical support for new ideas and their application	☐	☐	☐	☐	☐

1.6 *The following questions concern your understanding of* ***your team's objectives.*** *Please refer to* ***the past 6 months*** *and mark* ***the appropriate box*** *from the seven boxes to indicate how far each response describes your team.*

	Not at all		Somewhat			Completely	
	1	2	3	4	5	6	7
a) How clear are you about what your team's objectives are?	☐	☐	☐	☐	☐	☐	☐
b) How far are you in agreement with these objectives?	☐	☐	☐	☐	☐	☐	☐
c) To what extent do you think other team members agree with these objectives?	☐	☐	☐	☐	☐	☐	☐
d) To what extent do you think members of your team are committed to these objectives?	☐	☐	☐	☐	☐	☐	☐

1.7 *Consider to what extent each of the responses to the following questions describes* ***your team's task style.*** *Please refer to* ***the past 6 months*** *and mark the* ***appropriate box*** *from the seven boxes to indicate how far each response describes your team.*

	To a very little extent		To some extent			To a very great extent	
	1	2	3	4	5	6	7
a) Do your team colleagues provide useful ideas and practical help to enable you to do the job to the best of your ability?	☐	☐	☐	☐	☐	☐	☐
b) Are team members prepared to question the basis of what the team is doing?	☐	☐	☐	☐	☐	☐	☐
c) Does the team critically appraise potential weaknesses in what it is doing in order to achieve the best possible outcome?	☐	☐	☐	☐	☐	☐	☐
d) Do members of the team build on each other's ideas in order to achieve the highest possible standards of performance?	☐	☐	☐	☐	☐	☐	☐

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1.8 *The following statements concern **social support as provided by supervisors*** *Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement. Select only **one** answer.*

*Refers to your immediate superior.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) My supervisor is concerned about the welfare of those around him/her	☐	☐	☐	☐	☐
b) My supervisor pays attention to what I am saying	☐	☐	☐	☐	☐
c) My supervisor is helpful in getting the job done	☐	☐	☐	☐	☐
d) My supervisor is successful in getting people to work together	☐	☐	☐	☐	☐
e) My supervisor lets those he supervises set their own pace	☐	☐	☐	☐	☐
f) My supervisor lets those he supervises alone unless they want help	☐	☐	☐	☐	☐
g) My supervisor is willing to listen to job-related problems	☐	☐	☐	☐	☐
h) My supervisor encourages me to develop new ways of doing things	☐	☐	☐	☐	☐
i) My supervisor shows me how to improve my performance	☐	☐	☐	☐	☐
j) My supervisor provides me with adequate and timely job-related feedback	☐	☐	☐	☐	☐
k) My supervisor offers new ideas	☐	☐	☐	☐	☐
l) My supervisor encourages exchange of opinions and ideas	☐	☐	☐	☐	☐

1.9 *The following statements concern **social support provided by co-workers (or team members for those who work in a team).** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement. Select only **one** answer.*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) People I work with are competent in doing their jobs	☐	☐	☐	☐	☐
b) People I work with give their best efforts on their jobs	☐	☐	☐	☐	☐
c) People I work with help solve job-related problems	☐	☐	☐	☐	☐
d) People I work with take a personal interest in me	☐	☐	☐	☐	☐
e) People I work with are friendly	☐	☐	☐	☐	☐
f) People I work with encourage each other to work together	☐	☐	☐	☐	☐
g) People I work with are helpful in getting the job done	☐	☐	☐	☐	☐
h) People I work with provide me with adequate and timely job-related feedback	☐	☐	☐	☐	☐
i) I have made a number of friends on the job	☐	☐	☐	☐	☐

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1.10 *This part of the survey deals with **organisational constraints at work.** Please refer to **the past 6 months** and select the appropriate answer.*

How often do you find it difficult or impossible to do your job because of...?	Never	Rarely	Sometimes	Quite often	Very often
a) Poor equipment or supplies	☐	☐	☐	☐	☐
b) Organisational rules and procedures	☐	☐	☐	☐	☐
c) Other employees	☐	☐	☐	☐	☐
d) Your supervisor	☐	☐	☐	☐	☐
e) Lack of equipment or supplies	☐	☐	☐	☐	☐
f) Inadequate training	☐	☐	☐	☐	☐
g) Interruptions by other people	☐	☐	☐	☐	☐
h) Lack of necessary information about what to do/ how to do it	☐	☐	☐	☐	☐
i) Conflicting job demands	☐	☐	☐	☐	☐
j) Inadequate help from others	☐	☐	☐	☐	☐
k) Incorrect instructions	☐	☐	☐	☐	☐
l) Overcrowding of ward/unit	☐	☐	☐	☐	☐
m) Shortage of staff	☐	☐	☐	☐	☐

1.11 *This part of the questionnaire deals with **interpersonal conflict at work**. Please refer to **the past 6 months** and select only **one** answer.*

	Never	Rarely	Sometimes	Quite often	Very often
a) How often do you get into arguments with others at work?	☐	☐	☐	☐	☐
b) How often do other people yell at you at work?	☐	☐	☐	☐	☐
c) How often are people rude to you at work?	☐	☐	☐	☐	☐
d) How often do other people do nasty things to you at work?	☐	☐	☐	☐	☐

e) The professional/s, I have most conflict with is/are of the:

Same profession ☐ Other professions ☐ If other discipline/s, please specify ______________

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1.12 *The following questions concern **physical violence** **that you may have experienced** **in your unit**. Please refer to **the past 6 months** and select only **one** answer.*

In the past 6 months, **how often** *have you experienced* **physical violence** *from* **any** *of the following?*	Almost never	Rarely	Sometimes	Often	Very often	Always
a) Patients/clients	☐	☐	☐	☐	☐	☐
b) Relatives of patients/clients	☐	☐	☐	☐	☐	☐
c) Manager/Supervisor	☐	☐	☐	☐	☐	☐
d) Colleagues	☐	☐	☐	☐	☐	☐

If you have answered **yes to any of the above**, did you **report** this physical violence? **Yes** ☐ **No** ☐

1.13 *The following questions concern **harassment, bullying and abuse** **that you may have experienced** **in your unit**. Please refer to **the past 6 months** and select only **one** answer.*

In the past 6 months, **how often** *have you experienced* **harassment, bullying and violence** *from* **any** *of the following?*	Almost never	Rarely	Sometimes	Often	Very often	Always
a) Patients/clients	☐	☐	☐	☐	☐	☐
b) Relatives of patients/clients	☐	☐	☐	☐	☐	☐
c) Manager/Supervisor	☐	☐	☐	☐	☐	☐
d) Colleagues	☐	☐	☐	☐	☐	☐

If you have answered **yes to any of the above**, did you **report** this harassment, bullying or abuse? **Yes** ☐ **No** ☐

1.14 *The following questions concern the action taken by the leader/supervisor when staff experience **physical violence, harassment, bullying or abuse.** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement. Select only **one** answer.*

Do you agree with the following? The leader/supervisor...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) Takes effective action if members of staff are physically attacked	☐	☐	☐	☐	☐
b) Takes effective action if members of staff are bullied, harassed or abused	☐	☐	☐	☐	☐
c) Takes effective action if members of staff are racially harassed	☐	☐	☐	☐	☐
d) Takes effective action if members of staff are sexually harassed	☐	☐	☐	☐	☐

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SECTION 2 - Your Job

2.1 *This part concerns your job and deals with the **nature and control exercised in decision-making.** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement. Select only **one** answer.*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) My job requires that I learn new things	☐	☐	☐	☐	☐
b) My job involves a lot of repetitive work	☐	☐	☐	☐	☐
c) My job requires me to be creative	☐	☐	☐	☐	☐
d) My job allows me to make a lot of decisions on my own	☐	☐	☐	☐	☐
e) My job requires a high level of skill	☐	☐	☐	☐	☐
f) On my job, I have very little freedom to decide how I do my work	☐	☐	☐	☐	☐
g) I get to do a variety of different things on my job	☐	☐	☐	☐	☐
h) I have a lot of say about what happens on my job	☐	☐	☐	☐	☐
i) I have an opportunity to develop my own special abilities	☐	☐	☐	☐	☐
j) I have significant influence over decisions in my work group	☐	☐	☐	☐	☐
k) My work group or unit makes decisions democratically	☐	☐	☐	☐	☐
l) I have at least some chance that my ideas about policy wiii be considered	☐	☐	☐	☐	☐

m) *I supervise other people as part of my job*	No	Yes 1-4 people	Yes 5-10 people	Yes 11-20 people	Yes More than 20 people
	☐	☐	☐	☐	☐

2.2 *The following answers concern **the satisfaction that you experience in your job.** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement.*

How satisfied are you with the following areas of your job?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) The recognition I get for good work	☐	☐	☐	☐	☐
b) The support I get from my immediate supervisor	☐	☐	☐	☐	☐
c) The freedom I have to choose my own method of working	☐	☐	☐	☐	☐
d) The support I get from my work colleagues	☐	☐	☐	☐	☐
e) The amount of responsibility I am given	☐	☐	☐	☐	☐
f) The opportunities I have to use my abilities	☐	☐	☐	☐	☐
g) The extent to which my employer values my work	☐	☐	☐	☐	☐

Please answer **all** questions

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2.3 *The following questions concern* ***your beliefs about jobs in general.*** *Please indicate the extent to which you either agree or disagree with each statement. Select only* ***one*** *answer.*

	Disagree very much	Disagree moderately	Disagree slightly	Agree slightly	Agree moderately	Agree very much
a) A job is what you make of it	☐	☐	☐	☐	☐	☐
b) On most jobs, people can pretty much accomplish whatever they set out to accomplish	☐	☐	☐	☐	☐	☐
c) If you know what you want from a job, you can find a job that gives it to you	☐	☐	☐	☐	☐	☐
d) If employees are unhappy with a decision made by their boss, they should do something about it	☐	☐	☐	☐	☐	☐
e) Getting the job you want is mostly a matter of luck	☐	☐	☐	☐	☐	☐
f) Making money is primarily a matter of good fortune	☐	☐	☐	☐	☐	☐
g) Most people are capable of doing their jobs well if they make the effort	☐	☐	☐	☐	☐	☐
h) To get a really good job, you need to have family members / friends in high places	☐	☐	☐	☐	☐	☐

2.3 ***Your beliefs about jobs in general***	Disagree very much	Disagree moderately	Disagree slightly	Agree slightly	Agree moderately	Agree very much
i) Promotions are usually a matter of good fortune	☐	☐	☐	☐	☐	☐
j) To land in a good job, who you know is more important than what you know	☐	☐	☐	☐	☐	☐
k) Promotions are given to employees who perform well on the job	☐	☐	☐	☐	☐	☐
l) To make a lot of money you have to know the right people	☐	☐	☐	☐	☐	☐
m) It takes a lot of luck to be an outstanding employee on most jobs	☐	☐	☐	☐	☐	☐
n) People who perform their jobs well generally get rewarded	☐	☐	☐	☐	☐	☐
o) Most employees have more influence on their supervisors than they think they do	☐	☐	☐	☐	☐	☐
p) The main difference between people who make a lot of money and people who make a little money is luck	☐	☐	☐	☐	☐	☐

2.4 *The following statements are about the **demands that you face in your job.** Please refer to **the past 6 months** and indicate the extent to which you either agree or disagree with each statement.*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) My job requires working very fast	☐	☐	☐	☐	☐
b) My job requires working very hard	☐	☐	☐	☐	☐
c) I am not asked to do an excessive amount of work	☐	☐	☐	☐	☐
d) I have enough time to get the job done	☐	☐	☐	☐	☐
e) I am free from conflicting demands that others make	☐	☐	☐	☐	☐
f) My job requires long periods of intense concentration on the task	☐	☐	☐	☐	☐
g) My tasks are often interrupted before they can be completed, requiring attention at a later time	☐	☐	☐	☐	☐
h) My job is very hectic	☐	☐	☐	☐	☐
i) Waiting on work from other people or departments often slows me down on my job	☐	☐	☐	☐	☐
j) My job requires lots of physical effort	☐	☐	☐	☐	☐
k) I am often required to move or lift patients or very heavy loads on my job	☐	☐	☐	☐	☐
l) My work requires rapid and continuous physical activity	☐	☐	☐	☐	☐

2.5 *The following question concerns **incidents that you may have experienced in your job.** Please refer to **the past 6 months** and select the right answer.*

During the past 6 months how often have you been injured or felt unwell as a result of the following problems at work?	Almost never	Rarely	Sometimes	Often	Very often	Always
a) Moving and handling	☐	☐	☐	☐	☐	☐
b) Needle stick and sharp injuries	☐	☐	☐	☐	☐	☐
c) Slips, trips or falls	☐	☐	☐	☐	☐	☐
d) Exposure to dangerous substances	☐	☐	☐	☐	☐	☐

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2.6 *The following questions concern* ***the workload that you experience in your job.*** *Please refer to* ***the past 6 months*** *and select the appropriate answer.*

	Less than once per month or never	Once or twice per month	Once or twice per week	Once or twice per day	Several times per day
a) How often does your job require you to work very fast?	☐	☐	☐	☐	☐
b) How often does your job require you to work very hard?	☐	☐	☐	☐	☐
c) How often does your job leave you with little time to get things done?	☐	☐	☐	☐	☐
d) How often is there a great deal of work?	☐	☐	☐	☐	☐
e) How often do you have to do more work than you can do well?	☐	☐	☐	☐	☐
f) How often are you asked a question by a patient / colleague for whom you do not have an adequate answer?	☐	☐	☐	☐	☐
g) How often do you feel inadequately prepared to help with patients' needs?	☐	☐	☐	☐	☐
h) How often do you feel inadequately prepared to help the patient's family?	☐	☐	☐	☐	☐
i) How often do you feel uncertain regarding equipment's operation and functioning?	☐	☐	☐	☐	☐
j) How often are you left alone to deal with an emergency?	☐	☐	☐	☐	☐

2.7 *The following questions concern* ***accessing flexible working options in your present job*** *such as* ***reduced hours*** *and* ***flexible hours.*** *Please refer to* ***the past 6 months*** *when answering each question.*

a) Have you requested any of the **flexible working options** mentioned above?		**Yes** ☐	**No** ☐
b) **(If yes)**: Was your request granted?	**Yes completely** ☐	**Yes partially** ☐	**No** ☐

2.8 *The following statements concern* ***your future in your job****. Please indicate the extent to which you either agree or disagree with each statement. Select only* ***one*** *answer.*

To what extent do you agree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) I often think about leaving my current post	☐	☐	☐	☐	☐
b) I will probably look for a new job in the next year	☐	☐	☐	☐	☐
c) As soon as I can find another job, I will leave my current employer	☐	☐	☐	☐	☐

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2.9 *This part of the questionnaire deals with* ***job-related feelings over the past 6 months.*** *Please read each statement carefully and decide if you ever feel this way about your job. If you never had this feeling, please mark the box that corresponds to never. If you have had this feeling, indicate how often you feel it by marking the box that best corresponds to how frequently you feel that way.* ***Please note that the recipients refer to the people for whom you provide your service, care, treatment or instruction.***

Please refer to the past 6 months	Almost never	Rarely	Sometimes	Often	Very often	Always
a) I feel emotionally drained from my work	☐	☐	☐	☐	☐	☐
b) I feel used up at the end of the workday	☐	☐	☐	☐	☐	☐
c) I feel fatigued when I get up in the morning and have to face another day on the job	☐	☐	☐	☐	☐	☐
d) I can easily understand how my recipients feel about things	☐	☐	☐	☐	☐	☐
e) I feel I treat some recipients as if they are impersonal objects	☐	☐	☐	☐	☐	☐
f) Working with people all day is really a strain for me	☐	☐	☐	☐	☐	☐
g) I deal very effectively with the problems of my recipients	☐	☐	☐	☐	☐	☐
h) I feel burned out from my work	☐	☐	☐	☐	☐	☐

2.9 *Please refer to the past 6 months*	Almost never	Rarely	Sometimes	Often	Very often	Always
i) I feel I'm positively influencing other people's lives through my work	☐	☐	☐	☐	☐	☐
j) I have become more insensitive towards people since I took this job	☐	☐	☐	☐	☐	☐
k) I worry that this job is hardening me emotionally	☐	☐	☐	☐	☐	☐
l) I feel very energetic	☐	☐	☐	☐	☐	☐
m) I feel frustrated by my job	☐	☐	☐	☐	☐	☐
n) I feel I'm working too hard on my job	☐	☐	☐	☐	☐	☐
o) I don't really care what happens to some recipients	☐	☐	☐	☐	☐	☐
p) Working with people directly puts too much stress on me	☐	☐	☐	☐	☐	☐
q) I can easily create a relaxed atmosphere with my recipients	☐	☐	☐	☐	☐	☐
r) I feel exhilarated after working closely with my recipients	☐	☐	☐	☐	☐	☐

2.9 *Please read each statement carefully and decide if you ever feel this way about your job.* *If you **never** had this feeling, please **mark the box that corresponds to never.** If you have **had this feeling**, indicate how often you feel it by **marking the box** that best corresponds to how frequently you feel that way.*

Please refer to the past 6 months	Almost never	Rarely	Sometimes	Often	Very often	Always
s) I have accomplished many worthwhile things in this job	☐	☐	☐	☐	☐	☐
t) I feel like I'm at the end of my rope	☐	☐	☐	☐	☐	☐
u) In my work, I deal with emotional problems very calmly	☐	☐	☐	☐	☐	☐
v) I feel recipients blame me for some of their problems	☐	☐	☐	☐	☐	☐
w) At my work I feel bursting with energy	☐	☐	☐	☐	☐	☐
x) I find the work that I do full of meaning and purpose	☐	☐	☐	☐	☐	☐
y) Time flies when I'm working	☐	☐	☐	☐	☐	☐
z) At my job, I feel strong and vigorous	☐	☐	☐	☐	☐	☐
aa) I am enthusiastic about my job	☐	☐	☐	☐	☐	☐
bb) When I am working, I forget everything else around me	☐	☐	☐	☐	☐	☐

2.9 *Please refer to the past 6 months*	Almost never	Rarely	Sometimes	Often	Very often	Always
cc) My job inspires me	☐	☐	☐	☐	☐	☐
dd) When I get up in the morning, I feel like going to work	☐	☐	☐	☐	☐	☐
ee) I feel happy when I am working intensely	☐	☐	☐	☐	☐	☐
ff) I am proud of the work that I do	☐	☐	☐	☐	☐	☐
gg) I am immersed in my work	☐	☐	☐	☐	☐	☐
hh) I can continue working for long periods at a time	☐	☐	☐	☐	☐	☐
ii) To me my job is challenging	☐	☐	☐	☐	☐	☐
jj) I get carried away when I am working	☐	☐	☐	☐	☐	☐
kk) At my job, I am very resilient, mentally	☐	☐	☐	☐	☐	☐
ll) It is difficult to detach myself from my job	☐	☐	☐	☐	☐	☐
mm) At my work I always persevere, even when things do not go well	☐	☐	☐	☐	☐	☐

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SECTION 3 - Your Well-being

3.1 *This part of the questionnaire deals with **symptoms that you may be experiencing.** Please select the appropriate answer for each of the following statements.*

*During **the past 30 days** did you have any of the following symptoms? If you did have the symptom, did you receive any medical attention for it?*	No I didn't	Yes I did but I received NO medical attention for it	Yes I did but I received medical attention for it
a) An upset stomach or nausea	☐	☐	☐
b) A backache	☐	☐	☐
c) Trouble sleeping	☐	☐	☐
d) A skin rash	☐	☐	☐
e) Shortness of breath	☐	☐	☐
f) Chest pain	☐	☐	☐
g) Headache	☐	☐	☐
h) Fever	☐	☐	☐
i) Heartburn	☐	☐	☐
j) Eye strain	☐	☐	☐
k) Diarrhoea	☐	☐	☐
l) Stomach cramps (Not menstrual)	☐	☐	☐
m) Constipation	☐	☐	☐
n) Heart pounding when not exercising	☐	☐	☐
o) An infection	☐	☐	☐
p) Loss of appetite	☐	☐	☐
q) Dizziness	☐	☐	☐
r) Tiredness or fatigue	☐	☐	☐

3.2 *The following questions deal with the **frequency of symptoms over the past 6 months.***

	Never	Rarely	Sometimes	Quite often	Very often
a) How often do you become tired in a very short period of time?	☐	☐	☐	☐	☐
b) Do you have trouble with sweaty hands which feel damp and clammy?	☐	☐	☐	☐	☐
c) Do you have trouble with feeling nervous, fidgety or tense?	☐	☐	☐	☐	☐
d) Do you have trouble with poor appetite?	☐	☐	☐	☐	☐
e) Do you have trouble getting to sleep?	☐	☐	☐	☐	☐
f) Do you have trouble staying asleep?	☐	☐	☐	☐	☐

SECTION 4 - Move to New Hospital

4.1 *The following statements concern your views on the* ***proposed move to the NEW HOSPITAL.*** *Please indicate how strongly you agree or disagree with each statement by selecting the appropriate answer.*

The proposed move to the new hospital...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) is *adversely* affecting the way my unit/ward functions	☐	☐	☐	☐	☐
b) is *adversely* affecting my performance	☐	☐	☐	☐	☐
c) is *adversely* affecting me emotionally	☐	☐	☐	☐	☐
d) *will adversely* affect my job security	☐	☐	☐	☐	☐
e) is *positively* influencing me in my professional career	☐	☐	☐	☐	☐
f) is *stimulating* me to continuously update and develop myself professionally	☐	☐	☐	☐	☐

SECTION 5 - Work-life Balance

5.1 *The following questions concern the* ***hours you work at the Hospital.*** *Please answer each question.*

A. How many **hours a week** are you **contracted to work**? ____________________

B. On average, how many **additional PAID hours** do you work **per week at the Hospital over and above** your contracted hours?

0 hours ☐ **1-5 hours** ☐ **6-10 hours** ☐ **11-15 hours** ☐ **16-20 hours** ☐ **> 21 hours** ☐

C. On average, how many **additional UNPAID hours** do you work **per week at the Hospital over and above** your contracted hours?

0 hours ☐ **1-5 hours** ☐ **6-10 hours** ☐ **11-15 hours** ☐ **16-20 hours** ☐ **> 21 hours** ☐

D. Do you work **shifts or duties**? No ☐ Yes ☐ **If yes**, please specify ____________________

5.2 *The following questions concern* ***work-life balance in relation to your job.*** *Please refer to* ***the past 6 months*** *and indicate how strongly you agree or disagree with each statement by selecting the appropriate answer.*

To what extent do you agree with the following?	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a) The hospital management is committed to helping staff balance their work and home life	☐	☐	☐	☐	☐
b) My immediate supervisor/leader helps me find a good work-life balance	☐	☐	☐	☐	☐
c) I can approach my supervisor/leader to talk openly about flexible working	☐	☐	☐	☐	☐

Please answer **all** questions

ASTON UNIVERSITY

SECTION 6 - About You

6.1 *In order to help us analyse the data, it is important that we know* ***some background information about you and your job.*** *This information will only be used to determine differences along the continuum in secondary health care and NOT to identify groups, teams or individuals.*

a) **Gender:** Male ☐ Female ☐

b) **Age:** 16-20 ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ 51-65 ☐

c) **Marital Status:** Single ☐ Married/Living with partner ☐ Divorced/Separated/Widowed ☐

d) Which of the following describes your employment? *Please mark the* ***box*** *that applies to you:*

Full-time ☐ **Part-time** ☐ **Reduced hours** ☐

e) How long have you been involved in health care? (Please ***include*** student years)________**years**________**months**

f) How long have you been working in the present unit/ward?________**years**________**months**

g) What is your professional group?

Medical		Dental		Nursing		Allied Health Professional	
Consultant	☐	Consultant	☐	Nursing Officer	☐	Medical Lab Scientist	☐
Senior Registrar	☐	Senior Registrar	☐	Deputy NO	☐	Occupational Therapist	☐
Registrar	☐	Registrar	☐	SRN	☐	Physiotherapist	☐
SHO	☐	Dentist	☐	EN	☐	Podiatrist	☐
House Officer	☐	Dental Hygienist	☐	Midwife	☐	Radiographer	☐
		Dental Technologist	☐			Speech Language Pathologist	☐

Others: Pharmacist ☐ General Management ☐ Admin & Clerical ☐

Others not listed ☐ Please specify ________________

6.2 Comments and feedback

Do you have additional comments you would like to make in relation to the issues covered in this survey?

Would you like to receive a feedback report about the overall results of this survey? No ☐ Yes ☐

Thank you very much again for your participation in this study.
Kindly deposit the completed questionnaire in the collection box in your unit/ward.