Relationships Between Psychosocial Working Conditions and Multiple Employee Performance Measures

by

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on the last page. I hope readers will forgive my break with convention.
Abstract

The costs associated with occupational stress include a range of human (e.g., psychological distress, depression) and productivity-related (e.g., absenteeism, turnover) outcomes (Donald et al., 2005; Schabracq, Cooper, & Winnubst, 2003; Sutherland & Cooper, 2000). Yet despite the breadth of consequences linked to employee stress, little is known about the relationship between job stressors and multiple forms of work performance (Webster, Beehr, & Christiansen, 2010). The ability of employees to perform prescribed as well as discretionary tasks is central to the viability of all organisations and the lack of knowledge regarding the stressor-performance relationship is an important shortcoming in the job stress literature (Prater & Smith, 2011).

When examining the consequences of stress-related working conditions (stressors), job stress research has largely focused on health and behavioural outcomes, including stress-related illness, absenteeism and employee turnover (Allan et al., 2009; Barnes & Van Dyne, 2009; Lerner et al., 2010). The effect of stressors on the performance of individual employees has received less attention in job stress research (Beehr, Jex, Stacy, & Murray, 2000; Edwards, Guppy, & Cockerton, 2007) although, from a theoretical perspective, there are strong indications that stress and performance are closely connected. Stressful conditions can have a negative impact on performance by draining people’s energy and triggering emotional fatigue, which reduces the mental resources required for individuals to perform work tasks effectively (Barnes & Van Dyne, 2009; Gilboa, Shirom, Fried, & Cooper, 2008). Through averting attention and energy away from performing job functions in order to cope with work-related stressors, the individual’s capacity to perform their role is reduced (Jex, 1998). Resource-related stressors such as inadequate information, guidance, assistance and other support can be particularly damaging for performance as they not only diminish the individual’s ability to cope with the pressures of everyday work life, but they also deny
employees the knowledge and guidance needed to complete required tasks or complete them to the required standard (Gilboa, et al., 2008).

As job performance is so critical to organisational effectiveness, studies that can identify the conditions impacting on worker performance can play a key role in strengthening an organisations’ commitment to developing and supporting initiatives to change those conditions. Work-based stress prevention strategies require the ongoing endorsement of senior managers and other organisational leaders. An important way of generating this high level of support is to highlight the implications of stressful working conditions for employee performance, productivity, error rates and other organisational outcomes that are often at the forefront of managerial decision-making (Murphy & Sauter, 2003). One of the most important aims of interventions designed to improve organisational health is “aligning employee well-being and organisational effectiveness” (Griffin, Hart, & Wilson-Evered, 2000, p. 15). Satisfied employees can add little value to an organisation unless they are performing efficiently and productively. Conversely, generating sustained organisational success cannot be achieved through creating conditions that undermine the health and well-being of employees (Griffin, et al., 2000; Hart & Cooper, 2001).

The primary purpose of the current investigation was to undertake a comprehensive examination of the relationship between psychosocial working conditions and multiple forms of employee performance. The job stress literature has largely focused on the health and attitudinal outcomes associated with stress-related working conditions and little is known about several aspects of the stressor-performance relationship (e.g., Beehr, et al., 2000; Edwards, et al., 2007). Key shortcomings of the existing stressor-performance literature include a lack of knowledge regarding potential curvilinearity between working conditions and performance measures, a tendency to overlook possible interactions between job stressors (e.g., demand x control) and an assumption that heightened work demands undermine performance. Much of the research in this area has also failed to take into
account different types of employee performance (e.g., prescribed and discretionary) and has not assessed the role of intervening variables in mediating the relationship between stressors and performance. Finally, the vast majority of the research examining the impact of psychosocial working conditions on job performance has been based on cross-sectional designs and there is a dearth of information on the longitudinal relationship between stressor and employee performance. Given that job performance is a construct central to much of organisational psychology (Schmidt & Hunter, 1992; Viswesvaran & Ones, 2000) and has implications for the effectiveness of individual employees and the future viability of organisations, there is a clear need to undertake an extensive assessment of the stressor-performance relationship.

The particular conditions examined in the current study were those represented in one of the most widely recognised models predicting stress-related outcomes – the Demand-Control-Support (DCS) model (Brough, O'Driscoll, Kalliath, Cooper, & Poelmans, 2009; Hausser, Mojzisch, Niesel, & Schulz-Hardt, 2010). This model consists of three psychosocial working conditions; job demands, job control and social support (Karasek & Theorell, 1990). In order to identify the specific circumstances in which these psychosocial working conditions are associated with employee performance, a comprehensive investigation of the relationship was undertaken. This investigation included tests for direct linear, curvilinear and interactive associations between the independent and dependent variables. Further, the differential effects associated with working conditions were assessed by measuring three types of employee behaviour; in-role behaviours (IRB), positive organisational citizenship behaviours (OCB) and negative, counter-productive work behaviours (CWB). Finally, the current investigation assessed the role of important job attitudes (i.e., job satisfaction and organisational commitment) and health-related psychological responses (i.e., psychological well-being and psychological distress) as
potential mediating variables in the relationship between the DCS variables and the multiple measures of performance.

The participants taking part in the current study included public sector employees from a large state-funded law enforcement agency. A broad range of occupational groups were represented in the sample (e.g., human resource management practitioners, business managers, information technology consultants, media and communications experts, intelligence and forensic service officers) and data was collected using self-completed surveys undertaken at two different time points separated by an 18-month interval.

The current investigation consisted of three studies. The aim of Study 1 was to focus on the dimensionality of the employee performance construct and specific components of the measure in preparation for its inclusion in the cross-sectional and longitudinal regression analyses. An exploratory factor analysis was conducted to examine the factor structure of the job performance measure and confirm that in-role (IRB) and extra-role (OCB) behaviours were separate dimensions of performance, and that OCB directed toward individuals (OCB-I) was distinct from OCB directed toward the organisation (OCB-O) (Williams & Anderson, 1991).

Contrary to the expected three-factor structure for the job performance measure (Williams & Anderson, 1991), the measurement instrument identified in Study 1 consisted of a four-factor structure, comprising IRB, OCB-I, OCB-O and an additional factor comprising negatively-oriented items. The items contained in the fourth factor captured a pattern of counter-productive work behaviour (CWB), indicating a latent variable. As a result of these findings, an alternative four-factor model of job performance that conceptualises CWB as a distinct subscale was developed and used in subsequent regression analyses.

Study 2 was based on a cross-sectional study design and aimed to investigate the strength and nature of the relationship between psychosocial working conditions and
employee performance. The study compared the interactive versus additive models of the DCS, and considered curvilinear effects in order to provide a more comprehensive assessment of the way in which working conditions affect both in-role and extra-role performance. A further aim was to gain a greater understanding of the pathways through which stressors influence performance by examining attitudinal and health variables as potential mediators.

Study 3 was based on a longitudinal research design with a time lag of 18 months between T1 and T2 and sought to establish whether the results of the cross-sectional study were stable over time. The longitudinal study yielded no significant results, however, reverse causal analyses were conducted on the data in line with the aim of establishing whether psychosocial working conditions and performance types mutually influence each other. There was one instance of reverse causality, where greater psychological well-being at T1 was associated with greater work support at T2, although the majority of analyses demonstrated no evidence of reverse-causal effects.

Due to the lack of conclusive results in the longitudinal study, a second cross-sectional study was undertaken using T2 data in order to compare the pattern of results at two different time points (T1 and T2). In summary, there were a range of similarities and differences between the two cross-sectional studies. Direct effects, involving the individual DCS variables and performance outcomes, were apparent in both cross-sectional studies and all relationships were in the same direction in both studies. OCB-I was the only performance variable that did not reach significance in one of the studies (T1). The most prominent finding in both studies was that workload was positively associated with desirable types of performance (IRB, OCB-I and OCB-O) and negatively associated with CWB. The vast majority of the explained variance in the relationship between working conditions and performance was attributed to the additive effects of demand, control and support in both studies and there were no interaction effects in either study. Job control was a significant
predictor of two forms of performance (IRB and OCB-O) in T1, and high levels of support were associated with high levels of OCB-I, also at T1. There was some evidence of non-linear relationships in both studies, although the degree of curvilinearity was only slight and none of the relationships were the same at T1 and T2. Finally, the lack of mediating relationships at T2 contrasted with the two mediating relationships found at T1.

Overall, the findings from the current investigation suggest that the working conditions described in the DCS may offer valuable opportunities for enhancing the in-role and extra-role performance of employees. In addition, there were strong indications that job stressors can be perceived by employees as either challenges or hindrances. Similarly, findings revealed that psychosocial working conditions were differentially related to positive and negative forms of job behaviour. These results reinforce the need to include IRB, OCB and CWB when investigating the relationship between psychosocial working conditions and performance. Findings also suggest that performance may be enhanced through improvements in satisfaction levels and resources such as social support, rather than a reduction in workload, thereby supporting the use of a resource-based model to investigate the stressor-performance relationship. Although there were no consistent results in terms of curvilinear effects, evidence of several non-linear relationships support the inclusion of tests for curvilinearity in future stressor-performance studies.

Collectively, the outcomes of the current study suggest employee performance should be taken into account when examining the effects of stress-related working conditions. Furthermore, the current study highlights the need to pay careful attention to the types of analyses that are undertaken in stressor-performance research and not to assume the relationship between stress-related working conditions and employee performance parallels the stressor-health literature. Finally, the multiple forms of performance examined in the current study are critical for organisational functioning and a failure to consider all facets of
employee performance may result in erroneous conclusions regarding the relationship between psychosocial working conditions and the performance of employees.
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CHAPTER 1: Introduction

Statement of the Problem

The general problem addressed in the current study is the lack of information on the relationship between stress-related working conditions and multiple forms of employee performance. When examining the consequences of stress-related working conditions (also referred to as job stressors), the occupational stress literature has largely focused on health and behavioural outcomes, including psychological distress (Bailey, Dollard, & Richards, 2015; Lavoie-Tremblay, Trepanier, Fernet, & Bonneville-Roussy, 2014), burnout (Barnes & Van Dyne, 2009; Lerner, et. al., 2010), alcohol misuse (Barnes & Zimmerman, 2013), sickness absence and employee turnover (Allan, et al., 2009; Lavoie-Tremblay, Trepanier, Fernet, & Bonneville-Roussy, 2014). In contrast, the effect of stressors on the performance of employees has received comparatively little attention (e.g., Beehr, et al., 2000; Edwards, et al., 2007). Further, of the small number of studies that have focused on the stressor-performance relationship, the findings are far from clear. While the majority of these studies have shown that job stressors are negatively related to the performance of employees (Cynkar, 2007; Fay & Sonnentag, 2002; Gilboa, Fried & Cooper, 2008), others suggest there is no relationship (see Muse, Harris, & Feild, 2003 for a review), while a growing number of studies indicate that stressful working conditions can have a positive relationship with worker performance (LePine, Podsakoff, & LePine, 2005; Webster, et al., 2010).

In addition to these mixed findings, there is also a dearth of information on the circumstances in which stress-related working conditions contribute to performance and the attitudinal or health-related variables that might mediate this relationship. Much of the stressor-performance research has assumed that there is a direct linear pathway between stress-related conditions and performance (i.e., where fluctuations in performance are
proportional to the intensity of the stressor involved) yet there are strong indications that curvilinear (e.g., low and high levels of co-worker support) or interactive (e.g., high job demand combined with low co-worker support) effects may be involved (Muse, et al., 2003; van Vegchel, de Jonge, & Landsbergis, 2005). Likewise, while there is a large body of research that has examined the job-related attitudes (e.g., job satisfaction, organisational commitment) and/or health measures (e.g., psychological distress, employee well-being) that mediate the relationship between adverse working conditions and a range of employee cognitions and behaviours (e.g., intention to quit, absenteeism, labour turnover), very few have considered the mechanisms through which stress-related working conditions might impact on performance-based behaviours (Gilboa, et al., 2008).

The lack of research examining the ways in which working conditions influence performance has important implications for how organisations should manage stress-related working conditions in order to optimise performance outcomes. For example, a positive linear relationship between co-worker support and performance would mean that organisations should intervene where support is low. However an inverted-U shaped curvilinear support-performance relationship suggests interventions should target both high and low-support conditions. Further, a positive demand-support interaction would suggest that high job demands may enhance employee performance provided that workers have the advice, feedback, assistance and other supportive resources required to address the pace, volume and complexity of these demands. In this case, the demands faced by employees need to be closely monitored and interventions should focus on ensuring that the quality and timeliness of the support match the specific demands faced by employees.

The difficulty in knowing how to address the stressor-performance relationship is made more problematic by the lack of information on possible mediators. Identifying intervening variables such as job satisfaction and psychological distress can provide two important
benefits. First, knowledge regarding the intermediary mechanisms provides organisations with the opportunity to monitor these variables and, where necessary, to take action before they impact on employee performance. Second, the nature of the mediating variables can provide further insights into how the stressor performance relationship should be managed. While both adverse attitudinal and health-related responses would support the need for primary prevention strategies that seek to modify the work-based sources of job stress, heightened psychological responses (e.g., psychological distress) would also indicate that secondary and/or tertiary interventions would be needed to strengthen employees’ coping capacities and to help them make a quick return to effective psychological functioning (DeFrank & Cooper 1987). In summary, the lack of clarity regarding how specific working conditions may impact on employee performance and the intervening variables through which the effects of the stressor impact on performance makes it difficult to determine when and how these conditions should be managed in order to create working environments that enhance employee effectiveness.

There are two other shortcomings of the stressor-performance literature that have important practical implications, namely, the tendency to focus on prescribed or task-specific performance and the heavy reliance on cross-sectional studies. At a general level, employee performance can be separated into two categories, (1) roles that are prescribed by the organisation and are expected to be completed as part of the employee’s job description (also referred to as in-role performance) and (2) roles or behaviours that are volunteered by employees and are not expected or recognised by organisational leaders (also referred to as discretionary or extra-role performance) (Borman & Motowidlo, 1993; Hoffman, Blair, Meriac, & Woehr, 2007; Organ, 1988; Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Of the few studies examining the association between stress-related working conditions and employee performance, almost all have focused on employees’
ability to complete prescribed tasks and overlooked the influence on discretionary behaviours (Hoffman, et al., 2007; Motowidlo, Packard, & Manning, 1986). Psychosocial working conditions can have differential effects on prescribed and discretionary behaviours and, as discretionary performance impacts on workers’ ability to execute prescribed tasks, studies focusing solely on in-role behaviours may provide an incomplete assessment of the strength and nature of the relationship between working conditions and employees’ overall performance (Fay & Sonnentag, 2002; Podsakoff, et al., 2000; Webster, et al., 2010).

Finally, the lack of research examining the links between stress-related working conditions and multiple forms of performance is exacerbated by the heavy reliance on cross-sectional study designs and the uncertainty these raise over the sequential direction and longer-term stability of the identified relationships. Moreover, there is a clear need for stressor-performance research to be based on longitudinal designs that can demonstrate if and how the performance-related effects attributed to psychosocial working conditions remain over longer time periods and to test for reverse causal and reciprocal relationships.

To summarise the problems associated the stressors-performance research, there are a lack of studies examining the strength, direction and nature of the relationship between psychosocial working conditions and employee performance and very few studies have considered the extent to which this relationship is mediated by attitudinal and health-related variables. The vast majority of studies in this area have also operationalised employee performance as consisting solely of in-role behaviours, thereby overlooking the influence on discretionary contributions, and there is little information on the longitudinal relationships between stress-related working conditions and employee performance. These shortcomings represent major practical impediments for organisations, especially in terms of helping determine when and how stress-related working conditions should be managed.
in order to create working environments that are conducive to high levels of employee effectiveness.

**Purpose and Aims of Current Research**

In light of the key shortcomings of the stressor-performance research, the overall purpose of the current investigation is to undertake a comprehensive assessment of the strength, direction and nature of the relationship between stress-related working conditions and multiple measures of employee performance. The stress-related working conditions used in the current study were based on the Demand-Control-Support (DCS) model which proposes that the stress experienced by the employee increases when the demands of a situation exceed the levels of job control and/or social support available to the individual (Karasek, 1979; Karasek & Theorell, 1990). Although the hypothesised interactions between demand, control and support are the hallmark of the DCS, meta-analyses drawing on several decades of research indicate that the direct and additive effects of component variables are more likely to be supported rather than the synergistic effects (Hausser, et al., 2010; Van der Doef & Maes, 1999). The working conditions assessed in the current study will therefore include both the additive (demand + control + support) and the interactive (demand x control x support) terms. In relation to employee performance, the multiple forms of performance assessed in the current investigation include prescribed or in-role behaviours (IRB); positive discretionary behaviours (referred to as organisational citizenship behaviours, OCB) that have a helpful influence on colleagues (OCB-I) and the overall organisation (OCB-O); and negatively-oriented discretionary behaviours (referred to as counter-productive work behaviours, CWB). The current study also took into account potential mediators and these included two job attitudes (i.e., job satisfaction and
organisational commitment) and two measures of psychological health (i.e., psychological well-being and psychological distress).

A broad range of statistical analyses will be conducted in order to undertake a comprehensive assessment of the relationship between the working conditions represented in the DCS and the multiple measures of employee performance. These analyses aim to compare the DCS’s interactive and additive models while also taking into account the extent to which the independent effects associated with the component variables are linear or curvilinear. The current investigation also aims to gain a greater understanding of the mechanisms through which stressors influence performance by assessing the role of the attitudinal and health-related variables as potential mediators. At the same time, a key aim of the study will be to assess the differential effects attributed to the working conditions and the proposed mediators by examining the associations with IRB, OCB-I, OCB-O and CWB.

Finally, the relationships between the study variables will be assessed via both cross-sectional and longitudinal study designs. The primary aim of the longitudinal study will be to assess the sequential order of the variables and consider whether the relationships identified in the cross-sectional study can be maintained over time. The data on which these analyses will be undertaken was collected using self-completed surveys undertaken at two different time points separated by an 18-month interval.

**Overview of the Research**

Participants taking part in the current investigation were public servants employed by a state-funded law enforcement agency. The participants were based in a range of departments within the organisation (including human resources practitioners, training and development officers, education, business management, information technology,
operations co-ordinations, corporate strategy, legal, media and communications, intelligence and forensic services).

The current investigation comprises three studies. The aim of Study 1 is to focus on the dimensionality of the employee performance construct and specific components of the measure in preparation for its inclusion in the cross-sectional and longitudinal regression analyses. An exploratory factor analysis will be conducted on T1 data for this purpose.

Study 2 is a cross-sectional study design and aimed to investigate the strength and nature of the relationship between psychosocial working conditions and employee performance. The study, based on T1 data, will compare the interactive versus additive models of the DCS, and consider curvilinear effects in order to provide a more comprehensive assessment of the way in which working conditions affect both in-role and extra-role performance. A further aim is to gain a greater understanding of the pathways through which stressors influence performance by examining attitudinal and health variables as potential mediators.

Study 3 will be based on a longitudinal research design using T1 and T2 data, collected 18 months apart, with the aim of establishing whether the results of the cross-sectional study are stable over time. Reverse causal analyses will be conducted on the data in line with the aim of establishing whether psychosocial working conditions and performance types mutually influence each other.

The results of Studies 1, 2 and 3 will be outlined in Chapter 4 and subsequently discussed in Chapter 5, which also presents the current investigation’s contributions, implications, recommendations for future research, limitations and concluding remarks.
CHAPTER 2: Background Literature and Hypotheses

The purpose of the following chapter is to provide a comprehensive review of the occupational stress and employee performance literature. The overall goal of this review is to establish the current knowledge pertaining to the stressor-performance relationship and to identify the gaps in the research that provide the basis for the current investigation.

In the first part of this review, an overview of occupational stress is presented. Links between occupational stress and performance are then outlined, followed by an explanation of the range of performance types. Historical and contemporary models of stress are then presented, followed by the importance of resources in the investigation of stress and performance, and the relevance of resource-based models in the context of the current study. In the second part of the review the DCS model is introduced and explained, followed by a summary of the studies that have used DCS variables to predict performance. In the final section, areas for further investigation are identified, and the chapter concludes with an outline of the present study and research hypotheses.

The meaning and significance of occupational stress

In the following sub-sections, the meaning and significance of occupational stress is outlined, beginning with an overview of the conditions influencing the global marketplace and occupational health and safety public health laws. The general concept of stress is then described, followed by a section explaining the organisational impact of occupational stress. In the concluding sub-section, the costs, policies and practices relating to occupational stress are presented.

Occupational stress is a major concern for employees, industry and the wider community (Jex & Crossley, 2005; Le Blanc, De Jonge, & Schaufeli, 2000). In an
increasingly competitive global marketplace, organisational structures, systems and everyday work practices are rapidly changing (Tetrick & Quick, 2011). While these changes may help firms adapt to the pressures they face there are signs that the speed as well as the complexity of the change is taking its toll on employees due to heightened levels of job stress (Lee & Teo, 2005). Research has shown that organisational change contributes to job stress through increased work demands, inconsistent work hours, and job insecurity (Carayon & Smith, 2000) and there continues to be an international emphasis on identifying work-based sources of stress (Brough, et al., 2009).

The enormous costs associated with prolonged job stressors have been recognised by governments, with occupational health and safety and public health laws highlighting the importance of identifying and addressing high risk conditions (Bond, Cooper, & Sutherland, 2010; Brough, et al., 2009; Richardson & Rothstein, 2008). According to the EU Framework Directive (89/391/EEC), employers have an obligation to manage work-related stress through following principles of prevention that include identifying and assessing risks and combating them at the source where possible, in addition to adapting work to the individual and developing a coherent overall prevention policy. This directive also states that a key to preventing work-related stress and psychosocial risks is to focus on the organisation and management of work (European Agency for Safety and Health at Work, 2011).

**The concept of occupational stress**

The general concept of stress refers to a discrepancy between the demands of the environment and the resources of the individual (Stranks, 2005). When a person is exposed to a source of stress (or stressor), heightened arousal occurs, which prompts a stress response. The stress response involves an alarm in the homeostatic system associated with general and unspecific neurophysiological activation from one level of arousal to another.
level of arousal (Ursin & Eriksen, 2004). Selye’s (1956) landmark concept of stress holds that the stress response, in reaction to heightened arousal, is neither good nor bad. Stress is a non-specific response of the body to a demand, irrespective of whether the demand produces pleasant or unpleasant circumstances. Depending on the conditions encountered, two different types of stress can result in response to a demand (Selye, 1956/1984). Providing an individual has the capacities or resources to deal with the demands confronting them, the level of pressure is experienced as a positive form of stress, known as eustress. Alternatively, if there is a mismatch between environmental demands and individual needs, abilities or expectations, the negative form of stress, known as distress, is experienced. The negative experience of stress can include fear, anxiety, irritation, annoyance, anger, sadness, grief and depression (Selye, 1974). Although Selye’s initial theory of stress was based on observation of physical demands, the conceptualisation was later expanded to encompass psychological demands such as task uncertainty and heightened job complexity and emotional labour (Selye, 1974).

Stress occurring in the work environment is referred to as job stress or occupational stress, and encompasses the specific relationship between the employee and his or her work environment (Kahn & Byosiere, 1992; Lazarus & Folkham, 1984). Job stressors are stress-inducing environmental circumstances, events or conditions in the workplace (Beehr & Franz, 1987). Although it is possible for individuals to react positively to job stressors when demands can be adequately met (Karasek & Theorell, 1990), most job stress research has focused on the negative reactions that occur if stressors are not coped with effectively (Muse, et al., 2003). The individual negative reactions to these stressors are known as stress reactions or job strains (Schaufeli & Peeters, 2000).

Researchers have classified job stressors in numerous ways. For example, West and West (1989) investigated public sector organisations and grouped stressors into one of
four categories. These categories include: (a) stressors that exist outside the organisation (extra-organisational stressors; e.g., traffic to and from work); (b) stressors that come from within the organisation (organisational stressors; e.g., excessive paperwork; military-like organisational structure; (c) stressors that relate to the duties and responsibilities of work (task-related stressors; e.g., limited time to perform multiple tasks); and (d) stressors that relate to various work roles (individual role stressors such as worries about competency).

Several forms of job strain commonly identified in job stress research are physiological (e.g., heart palpitations and high blood pressure), psychological (e.g., job dissatisfaction and psychological distress) and behavioural (e.g., withdrawal behaviours including absenteeism and turnover). Job strain of any type is an individually perceived experience resulting from the interaction between the work environment and the coping resources of a particular employee (Schaufeli & Peeters, 2000).

When the discrepancies between demands and resources occur suddenly, the type of stress experienced is referred to as acute, and is usually due to an extreme event such as a car accident or assault (Lazarus & Folkham, 1984). Most often however, workers experience on-going demands that deplete their available resources over time. This form of stress is referred to as chronic stress or job strain (Karasek, 1979; Selye, 1982). Well-known models of job stress, such as the Demand-Control-Support model (DCS) (Karasek & Theorell, 1990), the Effort-Reward Imbalance model (ERI) (Siegrist, 2001) and more recently, the Job Demands-Resources model (JD-R) (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) provide conceptual frameworks for explaining and investigating the outcomes of chronic stress (Kleber & van der Velden, 2009). The current study will focus on this latter form of stress (i.e., job strain) and will be guided by the DCS.
The health effects of occupational stress

Work-based sources of stress can lead to a range of physical, psychological, emotional, behavioural and economic consequences (Dolan, 2007). Though the stressor-performance relationship investigated in the present study is an under-researched area, the effects of job stress on the health of employees, and the resulting organisational costs, are well-researched and widely recognised. The health impacts associated with job strain include physiological conditions such as severe muscular tension, headache, indigestion and cardiovascular disease (Amick et al., 1998; Flynn & James, 2009; Fox, Dwyer, & Ganster, 1993; Ganster & Schaubroeck, 1991; Kivimaki et al., 2006; Leventhal & Tomarken, 1987). Health-related impacts on employees experiencing job strain also include psychological outcomes such as burnout, depression, chronic anxiety and other forms of mental illness (Bailey, et al., 2015; Halbesleben & Buckley, 2004; Hauser, et al., 2010; Lavoie-Tremblay, et al., 2014; Levi, 1972; Schaufeli, Bakker, & Van Rhenen, 2009).

The organisational impact of occupational stress

Although chronic job stress can undermine the health and well-being of individual employees, there are also considerable organisational costs associated with excessive job stress. The competitive pressures faced by organisations, coupled with the on-going demand to achieve greater efficiency, often cause workers to experience job stress due to the requirement for greater work output with less available resources (Rousseau, 1997; Van Dyne & Ellis, 2004). Job stress has been associated with important organisational outcomes that are essential to organisational performance, including absenteeism, labour turnover and job performance (Lavoie-Tremblay, et al., 2014; Motowidlo, et al., 1986; Schaufeli & Peeters, 2000; Spector, Dwyer, & Jex, 1988; Virtanen et al., 2007; Williams et
At the organisational level, job stress can lead to low production quantity and quality, in addition to production errors (Donald et al., 2005). The organisational costs of stress include work-flow interruption, staff replacement and retraining and decreased productivity, although these are commonly overlooked when determining the overall impact of job stress (Donald, et al., 2005; Schabracq, 2003). The organisational losses associated with occupational stress signify that stress in the workplace is not only a health problem for employees, but should also be regarded as a loss of human resources with the capacity to impact organisational effectiveness (Jex & Crossley, 2005; Schabracq, et al., 2003).

Although the impact of employee stress extends beyond the individual to negatively affect organisational outcomes, there is insufficient research linking occupational stress with outcomes directly related to productivity. Of the few studies that have examined the relationship between stressors and indices of organisational effectiveness, evidence suggests that indicators of employee stress have been associated with a range of organisational outcomes, including reduced job performance and neglect of job duties (Jex & Crossley, 2005). It is accepted that stress significantly affects an organisation’s ‘bottom line’ (European Agency for Safety and Health at Work, 2011) although, as a consequence of the research focus on health outcomes, data mainly reflects the costs of stress-related withdrawal (absenteeism and labour turnover) rather than strain-related performance impairments and decrements.

**Costs, policies and practices related to occupational stress**

Studies of work-related strain indicate that occupational stress is both widespread and very costly. In financial terms, the annual economic cost of work-related stress in the EU-15 has been estimated at 20 billion Euros (European Agency for Safety and Health at Work, 2011), and in both the public and private sectors in Australia, the economic costs
are growing (Caulfield, Chang, Dollard, & Elshaugh, 2004; Keegal, Ostry, & LaMontagne, 2009; Macklin, Smith, & Dollard, 2006).

The causes and consequences of work-related stress are ongoing concerns in the 27 European Union (EU) member states. More than half of the 225 million workers report working at a very high speed and under tight deadlines, whilst more than one third of employees have no influence over task order in their jobs (European Foundation for the Improvement of Living and Working Conditions, 1999). These types of work-related stressors have contributed to the range of conditions that workers experience, as at least 22 per cent of the workforce complains of “stress” (European Foundation for the Improvement of Living and Working Conditions, 1999).

The European Agency for Safety and Health acknowledges that work-related stress is a major health and safety challenge for Europe. The enormous cost in terms of impaired health and economic performance is reflected in studies showing that almost one in four workers are affected by work-related stress, and up to 60 per cent of all lost working days have been attributed to chronic strain (European Agency for Safety and Health at Work, 2011). It is predicted that work intensification will continue to affect employees in the changing work environment of the future. Given that work-related stress carries psychosocial risks in addition to its significant effect on an organisation’s bottom line, industry has a strong ethical and financial obligation to address work-related stress (European Agency for Safety and Health at Work, 2011).

Multi-faceted approaches to stressor prevention have been designed in both the United Kingdom and the United States. The United Kingdom (UK) Health and Safety Executive management standards for work-related stress include demands, control and work support (Karasek, 1979; Karasek & Theorell, 1990) as three of the six areas of work that can lead to stress if not properly managed (HSE, 2009). In its National Strategy for the
Prevention of Work-related Psychological Disorders, the US National Institute for Occupational Safety and Health (NIOSH) outlines the main concerns as workload and pace of work; compatibility of work demands and responsibilities; and the provision of opportunities for employees’ social interaction and support (Sauter, Murphy, & Hurrell, 1990). The concerns of both the UK and US standards for prevention of work-related stress fit with the elements of demand, control and support contained in the Demand-Control-Support (DCS) model (Karasek & Theorell, 1990), which is the model that will be utilised in the present study.

In Australia, the degree of occupational strain parallels that reported in other industrialised countries (Guthrie, Ciccarelli, & Babic, 2010). The impact of stress in the workplace is well recognised, although stress claims have historically accounted for a relatively small percentage of all workers compensation claims (SafeWorkAustralia, 2010). Quite possibly, the extent of work-related stress experienced by Australian workers has been under-represented by the number of compensation claims. Health and safety laws recognise stress-related illness as compensable only if there is evidence that the disability is substantially caused through the employment situation (Macklin, et al., 2006) therefore acute stress events rather than chronic work stress may be more often reported (Dollard, Winefield, & Winefield, 2001). It was reported in the Compendium of Workers’ Compensation Statistics 2007-2008 (Safe Work Australia, 2010) that there were 131,110 serious workers’ compensation claims in 2007–08, which equates to 13.5 claims per 1000 employees or 8.0 claims per million hours worked. Of these claims, 5 per cent were in the non-physical category, which covers conditions such as nervous breakdown, anxiety and depression. Serious claims involving mental stress consistently had the longest median time lost from work, being over three times the median time of 3.9 weeks for all serious
claims and resulting in more than double the median payment of $5,800 for all serious claims (Safe Work Australia, 2010).

The most recent government statistics, however, present a new trend in the reporting of work-related stress. Data provided by the Federal work health and safety regulator in Australia, Comcare, reveals that the number of mental stress claims as a proportion of all workers compensation claims increased by 54 per cent over a period of only four years (Comcare, 2011). There is growing concern, on the part of the Federal government, that job stress currently poses the greatest threat to workplace health and safety, representing a serious loss of organisational productivity (Comcare, 2011).

**Investigating performance in occupational stress research**

Despite data from international and Australian-based sources indicating that chronic stress has become a serious concern for organisations and governments alike, there is limited research on the performance effects associated with prolonged exposure to stressful working conditions. When examining the consequences of stress-related working conditions (stressors) at the organisational level, job stress research has largely focused on health and behavioural outcomes, including psychological distress, burnout, alcohol misuse, sickness absence and employee turnover (e.g., Allan, et al., 2009; Amick, et al., 1998; Barnes & Van Dyne, 2009; Lerner, et al., 2010). The effect of stressors on the performance of individual employees has received less attention in job stress research (e.g., Beehr, et al., 2000; Edwards, et al., 2007). This is an important shortcoming as a better understanding of the stressor-performance relationship could improve efforts to prevent and reduce the effects of job strains. Job performance is regarded as an outcome most associated with the organisational costs of job stress (Donald, et al., 2005). Studies that can identify the conditions impacting on worker performance can not only play a key
role in gauging a more accurate understanding of the costs of stressful working environments, but can also help highlight those conditions that are more likely to lead to performance decrements. Job performance has implications for human resource management in general (Schmidt & Hunter, 1992; Viswesvaran & Ones, 2000), as well organisational effectiveness and profitability, and developing a more detailed understanding of the sources and consequences of performance-related stress may give organisations greater incentive to address the work-based sources of strain.

Individuals function in an ever-changing global context where technological, environmental, economic, political and socio-cultural forces shape the way in which work arrangements are being restructured. Cooper and colleagues (Cooper, Dewe, & O'Driscoll, 2001) posit that changes in workplace environments have been governed by technological and economic conditions and there is a need for wider application of perspectives that also emphasise psychological and socio-cultural dimensions of work experiences. A challenge facing researchers and practitioners in the field of job stress is the restructuring of workplace environments that enhance the well-being of individuals in addition to improving organisational productivity (Cooper, et al., 2001).

There is evidence that the impact of stress can increase the health care costs of businesses, however employee stress can also be costly to organisations in terms of reduced productivity and increased employee withdrawal (Donald, et al., 2005; Jex & Crossley, 2005). Within an organisational context, decreased job performance can have a substantial effect on bottom-line profitability. For example, in a survey of 90,000 employees worldwide conducted by Towers Perrin in 2007, results indicate that companies with a large number of employees experiencing poor psychological health resulting from job strain averaged a 33 per cent annual decline in operating income and an 11 per cent annual decline in earnings growth (Schwartz, 2010).
Although it has long been recognised that the contribution employees make to the overall efficiency of an organisation is directly related to how each person performs their work and what is produced (Cascio, 2000), there has been insufficient research investigating the relationship between strain-related working conditions and job performance (Bakker, et al., 2004; Jex & Crossley, 2005). Given that employee performance is a key contributor to organisational effectiveness and productivity, there is potential for the stress experienced by employees to have a significant impact on organisational productivity (Donald et al., 2005; Jex & Crossley, 2005).

**The link between stressors and performance**

From a theoretical perspective, there are strong indications that stress and performance are closely connected. Stressful conditions can have a negative impact on performance by draining people’s energy and triggering emotional fatigue, which reduces the mental resources required for individuals to perform work tasks effectively (Bakker, Van Emmerik, & Van Ret, 2008; Barnes & Van Dyne, 2009; Gilboa, et al., 2008). Through averting attention and energy away from performing job functions in order to cope with work-related stressors, it is expected that an individual’s ability to perform is reduced (Jex, 1998). In addition, when work demands exceed the resources available, the overload could be considered a threatening stressor with a deleterious impact on performance, due to the inadequate information, guidance, assistance and other resources to both deal with the stressor and complete the task (Bakker, et al., 2004; Gilboa, et al., 2008). In these conditions, high levels of stressors can be seen to reduce an individual’s capacity to exert control over their work environment, therefore adversely affecting their ability to perform effectively (Bakker, et al., 2004; McGrath, 1976).

The importance of considering the effects of workplace stressors in terms of job performance and organisational effectiveness, in addition to employee well-being, has
been identified in occupational stress research. Griffin, Hart & Wilson-Evered (2000) proposed that “aligning employee well-being and organisational effectiveness is one of the key goals of interventions designed to improve organisational health” (Griffin, et al., 2000, p. 15). The authors emphasised the need to focus on both employee well-being and an organisation’s ‘bottom line’ performance, as satisfied employees can add little value to an organisation unless they are performing efficiently and productively. This perspective recognises that employee well-being and organisational performance are determined by both individual and organisational factors, and that having a productive organisation should not be achieved at the expense of employees’ well-being (Griffin, et al., 2000; Hart & Cooper, 2001). The relationship between work characteristics, illness behaviours and well-being is complex, as the relationship is contingent on a wide variety of factors, and well-being does not simply equate to the absence of illness (Wainwright & Calnan, 2012).

**Measures of job performance**

When investigating the link between stressors and performance, it is also necessary to consider that the stressor-performance relationship is likely to vary according to the type of performance being measured (Fay & Sonnentag, 2002; Webster, et al., 2010). Performance is a multi-dimensional construct, which can be measured in a variety of ways. A meta-analysis of studies encompassing various psychosocial stressors and measures of job performance found evidence that several of the stressors had differential relationships with performance, and concluded that there is a need to further theorise and examine the reasons for differential associations (Gilboa, et al., 2008). The current investigation addresses the need to incorporate multiple forms of performance in job stress research, in addition to attitudinal and psychological mechanisms through which stressors may affect performance. The mechanisms through which stressors affect performance, represented as mediating variables in the research design, have received little research attention. The
failure to investigate mediating variables in the stressor-performance relationship has been identified as a gap in the literature (Gilboa, et al., 2008) and this gap will be outlined in the final section of the literature review. The following section will outline the different measures and dimensions of performance to be investigated in the current study.

The effort that employees invest in performing their jobs is a central factor in organisational effectiveness and is therefore an important topic of research in organisational behaviour. Job performance is generally defined as behaviour that is relevant to the goals of the organisation and can be measured in terms of the level of the individual’s contribution to those goals (Campbell, McCloy, Oppler, & Sager, 1993). Whilst employees contribute to organisational goals primarily through task (in-role) performance, which refers to the prescribed requirements of a particular job (Motowidlo, et al., 1986), job performance also includes non-task (extra-role) behaviours that are not formally recognised or rewarded by the organisation (Motowidlo & Van Scotter, 1994). Although most research on job performance focuses solely on task performance (Hoffman, et al., 2007), the business outcomes of organisations are not only affected by employees’ task performance but also their extra-role behaviours, which are discretionary. Research indicates that up to 25 per cent of the variance in companies' revenue and operating efficiency is accounted for by extra-role behaviours (Podsakoff, et al., 2000). Given that in-role and extra-role performance contributes to organisational effectiveness, it is important both measures are included in studies that focus on the relationship between working conditions and employee performance. The following sections provide an overview of the types and dimensions of performance that will be measured in the current investigation.
**In-role performance**

The most commonly measured form of job performance, task performance, refers to in-role behaviours that are directly related to producing goods or services, or activities that indirectly support the organisation’s core operations (Borman & Motowidlo, 1993; Campbell, et al., 1993). Employees who apply technical skills and knowledge to accomplish required tasks are demonstrating task performance. Normally, task performance involves the completion of duties and tasks specified in job descriptions or assigned to an individual employee (Hockey, 2000; Jamal, 1984) although activities may at times extend beyond specified duties to meet organisational goals and business objectives within a changing environment (Schmidt, 1993).

A key feature of task performance is that these activities are formally recognised and rewarded by the organisation. The execution of tasks that have been prescribed by the organisation is required under contractual obligation between the employee and employer (Motowidlo & Van Scotter, 1994). In traditional performance studies, overall job performance has been operationalised as task performance, which can be objectively observed and measured (Motowidlo, et al., 1986).

**Extra-role performance**

Organisations depend on the co-operation of employees in meeting organisational goals and therefore the definition of job performance needs to be broadened beyond in-role performance to include other types of performance that facilitate organisational functioning (Campbell, McHenry, & Wise, 1990; Wright & Cropanzano, 2000). These other types of performance consist of roles or behaviours that are volunteered by employees and are not expected or recognised by organisational leaders (also referred to as discretionary or extra-role performance). A number of forms are used to describe this
discretionary behaviour including contextual performance (Borman & Motowidlo, 1993),
pro-social organisational behaviour and extra-role behaviour (Podsakoff, et al., 2000),
organisational citizenship behaviour (OCB) (Organ, 1988) and discretionary work
performance (Hoffman, et al., 2007). OCB, which is the term most commonly used to
describe non-task performance, consists of discretionary activities that support the broader
environment in which the technical core must function. These behaviours include
volunteering for tasks not included in the job description, demonstrating effort, helping
and co-operating with others and supporting organisational objectives (Borman &
Motowidlo, 1993). OCB encompasses behavioural patterns that contribute to
organisational effectiveness through supporting the psychological and social context in
which task performance occurs (Borman & Motowidlo, 1993; Motowidlo & Van Scotter,
1994; Van Scotter, et al., 2000). Assisting co-workers, cooperating with supervisors or
suggesting improvements to organisational processes are all examples of OCB (Borman &
Motowidlo, 1993). Rather than concentrating on the distinction between in-role and extra-
role behaviour, there is an argument that it is through an improved understanding of the
behaviours supporting the broader organisational environment that we can better
understand job performance (Vey & Campbell, 2004).

OCB has been a widely studied topic in organisational behaviour research since the
term was first introduced by Organ and colleagues (Bateman & Organ, 1983; Organ, 1988;
Smith, et al., 1983). Interest in work-related behaviour that goes beyond prescribed tasks
and is not formally recognised by organisational reward systems has grown due to a
number of changes in the business environment, including less hierarchical management
and greater employee autonomy (Diefendorff, Brown, Kamin, & Lord, 2002; LePine,
Erez, & Johnson, 2002). Against the background of a rapidly changing business
environment, research has shown that the performance of discretionary work behaviours is

Over the past two decades the OCB construct has undergone numerous re-conceptualisations (Hoffman, et al., 2007). Initially, the construct consisted of two factors, namely altruism and generalised compliance, (Smith, et al., 1983) but was further developed by Organ (1988) to encompass five factors including altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. The factor structure was later condensed by Podsakoff and colleagues (Podsakoff & MacKenzie, 1997) to three factors (helping behaviour, civic virtue and sportsmanship) and subsequently expanded into a seven factor model including helping behaviour, sportsmanship, organisational loyalty, organisational compliance, individual initiative, civic virtue and self-development (Podsakoff, et al., 2000). Despite divergence regarding the number of factors, most conceptualisations of OCB suggest that the construct consists of two major dimensions. These can be characterised as (1) altruism, or pro-social behaviours directed at specific individuals or groups within the organisation, and (2) generalised compliance, which consists of pro-social behaviours directed at the organisation (Rioux & Penner, 2001).

In recognition of the importance of distinguishing task performance from discretionary actions in the measurement of citizenship behaviours, Williams and Anderson (1991) re-conceptualised the construct of OCB by demonstrating that traditional performance of in-role behaviour (IRB) could be separated from two types of extra-role behaviour. Williams and Anderson (1991) proposed that organisational citizenship behaviour that is aimed at the organisation (OCB-O) is independent of organisational citizenship behaviour directed toward individuals (OCB-I). Based principally on Organ’s (1988) five factor classification, the dimensions of sportsmanship, civic virtue and conscientiousness were categorised as OCB-O, whereas altruism and courtesy were
characterised as OCB-I. The measure developed by Williams and Anderson (1991) has been utilised by researchers seeking to differentiate in-role from extra-role behaviour (Mayhew, Ashkanasy, Bramble, & Gardner, 2007; Vigoda-Gadot, 2007) and measure OCB directed at either individuals or the organisation (Choi, 2007; Tan & Tan, 2008; Vigoda-Gadot, Beeri, Birman-Shemesh, & Somech, 2007) however distinctions between the OCB-O, OCB-I and IRB dimensions in these studies are not definitive.

The performance measure developed by Williams and Anderson (1991), which includes IRB, OCB-O and OCB-I, will be utilised in the current investigation. Given that there is some conjecture regarding distinctions between the dimensions of IRB, OCB-O and OCB-I (Mayhew, et al., 2007; Vigoda-Gadot, 2007), the scale will be factor analysed in Study 1 of the current investigation, prior to being used in the analyses examining the relationship between psychosocial stressors and employee performance.

**Historical models of stress and performance**

In the context of employee performance, stress is associated with the suitability of the work and the employee’s capacity to maintain sufficient attention to carry out required work tasks (Cooper, et al., 2001). Stress can be experienced in reaction to either over or under-stimulation, and several key theories address levels of stimulation. According to both the “general adaptation process” proposed by Selye (1956) and the earlier landmark performance hypothesis of Yerkes and Dodson (1908), neither too much nor too little strain generally has a favourable impact on the individual. In addition, Warr’s (1987) “vitamin model” is based on the analogy that vitamins are necessary for physical health but, beyond the optimum level, an increased intake can be harmful (Warr, 1987; 1990a). It is posited by the vitamin model, and also Gardner’s (1986) activation theory, that a low level of activation is associated with a low level of performance due to lack of stimulation and boredom, whereas increased activation is linked to greater alertness, positive emotion
and enhanced performance (Gaillard, 1993; Gardner, 1986). Following the optimum level of stimulation, additional activation results in mental overload, and reduced performance (Gaillard, 1993; Gardner, 1986). This perspective holds that the relationship between stressors and performance is non-linear, and is commonly referred to as the “inverted-U” model (Gardner, 1986; Selye, 1956/1984; Warr, 1987, 1990a; Yerkes & Dodson, 1908). The level of stress, which increases from low towards an optimal level, after which point performance is negatively affected, can be represented by graphing the results to form an inverted-U shaped curve.

Within the workplace, a certain level of stress is necessary for optimal performance, whereas excessive levels of stress are proposed to have deleterious effects on performance (Muse, et al., 2003). When employees are consistently placed in situations where it is difficult to properly attend to their work due to adverse working conditions, chronic stress is produced (Cooper, et al., 2001). Under such adverse conditions, the inability to manage a task in a systematic and methodical manner causes confusion and performance breaks down (Schabracq, 2003). Alternatively, work that does not provide enough challenge to keep an employee involved in the task requires that the individual compel themselves to attend to the work and maintain focus. In these circumstances, the employee becomes bored, distracted and less productive due to the job strain induced by under-stimulation (Schabracq, 2003).

Consistent with the inverted U-shaped hypothesis of stress and performance (Gardner, 1986; Selye, 1956/1984; Warr, 1987, 1990a; Yerkes & Dodson, 1908), Karasek’s (1979) original model of job strain acknowledged that neither too much nor too little strain was favourable to the individual. Although a curvilinear relationship between stressors and performance has been proposed by Karasek and earlier theorists, and the hypothesis has intuitive appeal (Muse, et al., 2003), investigations of non-linear stressor-performance
relationships are limited and have received mixed results (Muse, et al., 2003; Rydstedt, Ferrie, & Head, 2006). According to Muse and colleagues (2003), the inverted-U hypothesis of stress and performance has not been adequately tested in stressor-performance research. This gap in the literature is addressed by the current investigation and will be detailed in a subsequent section reviewing areas for further investigation.

**Contemporary models of stress in relation to performance**

Whilst job stress research has historically focused on stress-related working conditions that are largely detrimental for employees (Allan, et al., 2009; Barnes & Van Dyne, 2009; Lerner, et al., 2010), recent research has recognised that potential outcomes of stressors can be more positive (LePine, et al., 2005; Webster, et al., 2010). Contemporary models of stress are based on the proposition that stress is transactional in nature. The transactional model acknowledges that stress is a continuous process of causes and effects operating via the transactions between an individual and their environment (Cox & Mackay, 1981). These transactions consist of appraisals of the demands faced in a given situation, and an assessment of whether the available resources will enable the individual to cope adequately with those demands. Based on Lazarus’ stress and coping work (Lazarus, 1966), the transactional model views stress as a dynamic, reciprocal process in which individuals and the environment are influencing each other (Lazarus & Folkham, 1984). This conceptualisation of the stress process is subjective as it depends on an individual’s appraisals and perceptions of their environment. According to the transactional approach, stress is an inherent aspect of the context in which individuals appraise their environments in terms of the potentially stress-inducing demands, and the resources available to meet those demands (Lazarus & Folkham, 1984).

In relation to job performance, the transactional model provides the possibility for individuals to perceive stressors as either positive or negative. Recent conceptualisations
of the stress process in relation to performance acknowledge that, although stressors lead to strains that have undesirable outcomes, it is possible for stressors to produce other outcomes which can be either positive or negative (LePine, et al., 2002; Webster, et al., 2010). Conceptualising stressors as either threatening goal achievement (hindrance) or facilitating one’s goals through enhanced effort (challenge) makes possible an interpretation of dual outcomes (Cavanaugh, Boswell, Roehling, & Boudreau, 2000). The challenge/hindrance stressor model proposes that performance will increase rather than decrease when a stressor such as high workload (demand) is perceived as a challenge, and this perspective widens the debate around the effects of occupational stress.

When high performers take on additional tasks and responsibilities and are motivated to perform them well, high work demands can be perceived as a challenge that is positively rather than negatively associated with performance. When a stressor is appraised as a challenge it will arguably lead to internal arousal and higher performance outcomes (LePine, et al., 2005). Yet, research also suggests that physical arousal associated with job stress only enhances performance to a certain extent, after which further stress produces hyper-arousal and leads to decrements in performance (Donald, et al., 2005).

The perspectives on stress outlined in the preceding sections suggest that both resources and levels of stimulation (Gilboa, et al., 2008; LePine, et al., 2005; Selye, 1956/1984; Warr, 1987; Yerkes & Dodson, 1908) are important in determining whether stress-related working conditions diminish or enhance performance. Two key models in job stress research; the Conservation of Resources theory (COR, Hobfoll, 1989) and the Job Demands-Resources theory (JD-R, Demerouti, et. al., 2001), focus on resources, as outlined shortly in this chapter. Further, the impact of occupational stressors on performance and organisational productivity has been included in a model of
organisational health that encompasses ‘the bottom line’ (Griffin, et al., 2000). Although these theoretical underpinnings have been identified, more evidence for how stress affects performance is required (Chatgut & Algom, 2003).

**The current study’s working definition of stress**

The stress response is a necessary physiological response, operating as a general alarm that occurs when there is a threat to a person’s equilibrium (Ursin & Eriksen, 2004). The stimulus that triggers the stress response is referred to as a stressor (Selye, 1956/1984). Various frameworks have been developed to conceptualise occupational stress, giving consideration to levels of stimulation and resources. The following section will outline the models which focus on resources as an important aspect of the work environment, in addition to the inherent stressors. These resource-based models, which guide the current investigation, reflect the prevailing transactional view that work stress depends on the way that jobs are constructed and managed (Dollard & Winefield, 2002) and the meaning individuals give to demanding situations (Dewe, 1991). Measuring the perceptions of individuals regarding the demands they face and the resources available to them, rather than focusing solely on the person’s response to an external stimulus, can provide a better understanding of the transaction between the individual and the environment (Dewe, 1991).

The present study is based on the premise that job stress is not necessarily negative, but depends on the meaning that individuals attribute to stressors, which includes the appraisal process central to the transactional approach (Dewe, 1991). For example, when a worker experiences on-going demands that deplete their available resources, job strain will occur and result in negative outcomes. However, should an employee face a high level of job demands in the presence of adequate resources, the stressor (high job demands) may be experienced as a challenge that improves performance (Karasek & Theorell, 1990).
The current investigation aims to test a well-established model of occupational stress that allows for stressors to be perceived by the employee as positive or negative in regard to performance, namely the Demand-Control-Support model (DCS) (Karasek, 1979; Karasek & Theorell, 1990). The DCS focuses on both the stressors inherent in the work environment and the available resources (Karasek & Theorell, 1990).

**The importance of resources in occupational stress research**

Resources play a key role in the stress process. As outlined in the previous section, stress can be viewed as a transactional process in which an individual appraises the demands inherent in a particular situation and makes an assessment of their ability to cope with those demands, based on the available resources (Lazarus & Folkham, 1984). A number of resources are referred to in models of occupational stress, including the model that will be used in the current study; the DCS (Karasek, 1979; Karasek & Theorell, 1990). Prior to presenting the DCS model, an explanation of how resources are related to occupational stress will be provided through briefly examining two resource-based theories that are relevant to the current investigation; Conservation of Resources (COR) theory (Hobfoll, 1989) and the Job Demands-Resources (JD-R) theory (Demerouti, et al., 2001).

**The Conservation of Resources theory**

Conservation of Resources (COR) theory (Hobfoll, 1989) proposes that individuals will seek to minimise the discomfort experienced when they are confronted with excessive demands by endeavouring to protect, conserve and build important resources (Hobfoll, 1989). Such resources include energies and conditions that are valued by the individual. Psychological stress, according to the COR theory, is a result of actual or perceived loss of resources, or a failure to re-gain resources following an investment of resources (Hobfoll,
1989). In addition to predicting that individuals will strive to minimise the loss of resources when facing a stress-inducing experience, the COR theory also predicts that when individuals are not confronted with stressors they will seek to develop excess resources as insurance against future resource loss (Hobfoll, 1989). One of the ways in which individuals can enrich their resources is by investing resources in aiding others through social support.

The issue of perception, or personal appraisal of situations confronting the individual, is also addressed in the COR theory. When appraising a potentially threatening situation, an individual may conserve resources by reinterpreting the threat (represented by the stressor) as a challenge that will not deplete available resources. This perception of a demanding situation as challenging rather than threatening is possible, given that stressors can be assessed as positive or negative, depending on personal appraisal (Hobfoll, 1989). The concept that stressors can be perceived as positive or negative is also adopted by the challenge-hindrance hypothesis (Cavanaugh, et al., 2000; LePine, et al., 2005). Both COR theory and the challenge-hindrance hypothesis draw on the stress appraisal process that operates within the transactional stress model (Lazarus & Folkham, 1984). The transactional stress model proposes that a potentially stressful situation may be appraised as either a harmful threat, or as an opportunity for growth and potential gain, depending on the resources that individuals have to cope with the situation at hand.

According to COR theory, social support is a resource that can be increased through investing support in others (Hobfoll, 1989). Studies using the COR model have illustrated the importance of both work and non-work social support and their association with work stress. The COR model has been used in work stress research to investigate the influence of chronic work and family stressors (Grandey & Cropanzano, 1999), the relationship between work pressure and exhaustion (Demerouti, Bakker, & Bulters, 2004)
and the importance of resources in preventing or coping with conflict between work and
home roles (Lapierre & Allen, 2006; Rosenbaum & Cohen, 1999).

Social support can be of benefit where social interaction does not increase stress
already being experienced. Taking action to develop resources, such as social support, can
provide insurance against future resource loss. However, there are limitations on the
effectiveness of this strategy. The effects of social support have been found to be time-
limited (Hobfoll, 1989). Hobfoll suggests that individuals judge whether their resources fit
the demands placed upon them and that the “interplay between resources and situational
needs changes over time as stressor sequences unfold” (Hobfoll, 1989, p. 521). Given that
time may be a factor in the relationship between stressors and resources, it is important
that studies examining the impact of psychosocial working conditions on employee
outcomes, such as the current investigation, include longitudinal analyses.

The Job Demands-Resources theory

Another key resource model of stress is the Job Demands-Resources (JD-R) theory
(Demerouti, Bakker, Nachreiner & Schaufeli, 2001). The JD-R is founded on the
assumption that the psychosocial work characteristics of any job can be divided into two
groups, namely job demands or job resources. Job demands consist of the features of the
job that require consistent physical and/or psychological effort and are consequently
associated with particular physiological and/or psychological costs. Job resources refer to
the physical, social or organisational aspects of the job context that are utilised in
achieving work goals or reducing demands and the associated physiological and/or
psychological costs. Job resources can also stimulate learning and development and may
enhance motivation (Demerouti, et al., 2001; Schaufeli & Bakker, 2004). The JD-R model
posits that a broad variety of work characteristics can be combined into the categories of
job resources and job demands, in contrast to a limited number of aspects proposed by other models (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008).

The current study has been informed by the JD-R as job resources and job demands have been linked to both in-role and extra-role performance (Bakker & Demerouti, 2007). The JD-R has been used to test whether job demands predict in-role performance and whether resources predict extra-role performance. In a study of employees across a range of sectors and occupations, Bakker and colleagues found that demands did predict in-role performance through exhaustion and resources predicted extra-role behaviour through disengagement (Bakker, et al., 2004). The central idea in this study was that work-based demands and resources have differential effects on in-role and extra-role performance. This result reinforces the need to include different types of performance in studies using resource-based models of stress to investigate performance.

**The link between resource-based models of stress and performance**

The COR, JD-R and DCS models equally emphasise the importance of work design characteristics such as demands and control, although COR includes internal coping mechanisms as resources when used by individuals attempting to modify or avoid stressful conditions (Parkes, 1990). The presence of resources is critical for providing employees with the capability for high levels of performance because worker output depends heavily on the amount of resources available for task accomplishment (Bakker, et al., 2008; Beal, Weiss, Barros, & MacDermid, 2005; Luchman & González-Morales, 2013). High levels of exhaustion associated with stressful working conditions indicate that employees possess insufficient resources to effectively handle the demands of the job, resulting in impaired performance (Bakker, et al., 2004; Taris, 2006).

Although broad categories of resources are common to the COR and JD-R models, the resources prescribed by the DCS model are confined to job control and social support,
as will be detailed in the section outlining the DCS. The review of the DCS follows the next section, which explains the relevance of resources to employees working in public sector law enforcement contexts.

**Resources relevant to public sector law enforcement contexts**

A growing number of studies have highlighted the need for job stress research to be underpinned by theoretical frameworks that closely match the organisational and social contexts in which the study is undertaken (Narayanan, et al., 1999; Noblet & Rodwell, 2008; Sparks & Cooper, 1999). Participants taking part in the current study were public servants working in a large state-based police service and hence it is important to highlight the resources that are particularly relevant to this context. Previous literature on stress within law enforcement organisations has found that organisational culture, excessive workload, and problems with the way work is organised have repeatedly been found to influence stress amongst employees (Brown & Campbell, 1990; Shane, 2010). Studies have shown the occupational stressors ranked most highly by employees are organisational issues such as the demands of work impinging upon home life, lack of consultation and communication, lack of control over workload, inadequate support, problems with co-workers, and excess workload in general (Jackson & Maslach, 1982; Shane, 2010).

Although the findings of these studies on stress within law enforcement agencies relate to health outcomes, the workplace problems continually found to influence occupational stress could also affect key resources associated with performance outcomes. In a review of police stress research, Abdollahi (2002) argues that organisational factors within law enforcement agencies are commonly cited as key stressors, yet exploration of the topic is limited. It is suggested that, although the focus of police stress research has so far been on health consequences, impairments to mental well-being compromise optimal work performance (Abdollahi, 2002). Recognising the impact of adverse health
consequences on performance as stress-related may be particularly important, in addition to clarifying the contribution of organisational stressors specific to law enforcement agencies.

Organisational factors, such as the culture and dominant management style existing within an organisation, can contribute to psychological strain (Cooper & Cartwright, 1994). In terms of the public sector context, it can be argued that the hierarchical and bureaucratic organisational structures of state-funded organisations may restrict input from employees regarding decisions affecting their work (Cooper, et al., 2001). Furthermore, the overly formalised organisational processes adopted by public sector organisations, in addition to inadequate communication between managerial and non-managerial personnel, may have adverse consequences for the effective functioning of public servants. As Cooper and colleagues (2001) suggest, the influence of organisational factors is contingent on the meaning and importance attached to them by individuals. Employee perceptions are extremely important as they diverge a great deal between individuals, in relation to working conditions, including perceived changes and the effects of interventions (Hasson et al., 2014; Jepsen & Rodwell, 2012). Therefore, it is critical to investigate individual perceptions and values relating to the psychosocial work environment.

Another organisational factor that has contributed to reduced levels of resources, including decision latitude and support, is the implementation of new management strategies within public sector organisations known as ‘new public management’ (NPM) (Hood, 1995). Many public sector agencies throughout the US, UK and Australia, including the state-based law enforcement organisation from which the current sample of public servants was drawn, have undergone significant structural and procedural reforms in recent years (Dawson & Dargie, 2002; Pollitt, 2002). These managerialist reforms, emphasising cost containment and performance improvement, have produced an increase
in the volume and pace of work, and a greater level of responsibility for employees, without corresponding levels of control or support (Butterfield, et al., 2004; Dixon, et al., 1998). The changes have produced conditions of greater demands with less resources, which have taken their toll on public sector employees, especially in terms of increased stress, growing dissatisfaction and diminishing commitment (Ibsen, et al., 2011; Korunka, et al., 2003; Mikkelsen, Osgard, et al., 2000).

The effects of the management reforms on already scarce resources in the public sector emphasise the importance of using resource-based models to investigate occupational stress in the organisations that have undergone NPM reforms. The COR, JD-R and DCS models acknowledge the significance of resources to job stress, although these models are usually used to investigate health outcomes of stress rather than performance outcomes. The current study will consider the importance of stressors and resources in relation to performance, utilising the DCS model and also drawing on the other two resource-based models (COR and JD-R). The following section will now outline the DCS model in detail.

**The Demand-Control-Support Model (DCS)**

This section of the literature review will focus on the DCS, highlighting the significance of the model and the reasons why it is well-suited to investigating employee performance. The development of the model will be explained, then the components of the model will be outlined in relation to performance. The additive and interactive perspectives of the DCS model will then be examined, followed by an explanation of the reasons for choosing the DCS model to guide the current investigation. A summary of DCS and performance studies will be also provided. The final section of the literature
review will address the areas for further investigation and will be used to help inform the study hypotheses in the current study.

The meaning and significance of the DCS model

The Demand-Control-Support model (DCS; Karasek & Theorell, 1990), is one of the most commonly cited job stress models in the organisational psychology literature and is frequently used to guide the development of large-scale employee well-being and job stress investigations (de Lange, Taris, Kompier, Houtman, & Bongers, 2003; Hausser, et al., 2010; Van der Doef & Maes, 1999). Also referred to as the Job Strain Model, the DCS has been found to predict a wide range of outcomes that are important to both employees and employers including psychological well-being, job satisfaction, commitment to the organisation and sickness absence (e.g., Hausser et al., 2010; Van der Doef & Maes, 1999). Despite the strong predictive capacity of the model, very few studies have examined the extent to which the DCS is associated with employee performance, even though it has the potential for doing so (Flynn & James, 2009; Jex & Crossley, 2005). The job stress literature has generally focused on health and attitudinal outcomes when examining the consequences of adverse working conditions and where behaviours have been taken into account, these tend to be limited to absenteeism, labour turnover and other forms of employee withdrawal (Cooper & Dewe, 2004; Lavoie-Tremblay, et al., 2014; Smulders & Nijhuis, 1999; Taris, Schreurs, & Van Iersel-Van Silfhout, 2001; Verhaeghe, Mak, Van Maele, Kornitzer, & De Backer, 2003).

Originally formulated by Karasek in 1979, the Demand-Control (DC) model was later expanded to include social support, becoming the DCS model (Karasek & Theorell, 1990). The full DCS model encompasses the DC and DCS models and both are taken into account in this literature review. In order to reduce confusion, the current study will use the term ‘DCS’ to capture both the DC and DCS models, unless otherwise specified.
The DCS was designed primarily to investigate individual level health-related outcomes and has been widely used for this purpose (Jex & Crossley, 2005). However, Karasek’s (1979) original formulation of the job strain model was also used to test for “objective evidence that the work environment takes its toll on job-related behaviour” (p. 296) by measuring sick days and job dissatisfaction. Karasek and Theorell (1990) contended that the predictions of the DCS model were comparable with the non-linear hypotheses of Selye’s model of optimal activity level, and with Yerkes and Dodson’s prior work, in determining optimal job performance by workers (Selye, 1956/1984; Yerkes & Dodson, 1908).

According to each of these non-linear hypotheses, either too much or too little exposure to stress-inducing conditions can be deleterious to performance. The optimal range is therefore likely to occur in the centre of the stress continuum, following an inverted-U shape rather than a linear relationship (Karasek & Theorell, 1990). The original DC model was used to test the effect of working conditions on performance, and the authors subsequently compared the DCS model with the inverted-U hypothesis of stress and performance (Karasek, 1979; Selye, 1956/1984; Yerkes & Dodson, 1908). It therefore appears clear that, in addition to health outcomes, Karasek and Theorell had hoped the DCS model could be used to explain performance outcomes. As job performance is so critical to the viability of organisations, studies that can identify the conditions impacting on worker performance can play a key role in strengthening organisations’ commitment to developing and supporting initiatives to change those conditions. Work-based stress prevention strategies require the ongoing endorsement of senior managers and other organisational leaders. As recognised by Murphy and Sauter (2003), an important way of generating this high level of support is to highlight the implications of stressful working conditions for employee performance, productivity, error rates and other organisational
outcomes that are often at the forefront of managerial decision-making (Murphy & Sauter, 2003).

**Development of the DC and DCS models**

**Original model**

The original two-dimensional DC model (Karasek, 1979) was based on the psychological demands of work, skill use, and task control and their ability to predict a wide range of health and behavioural consequences of the organisation of work (Karasek & Theorell, 1990). Karasek (1979) suggested that two important aspects of the work environment needed to be distinguished at the individual level if a stress-management model of job strain was to be effective. The first aspect consists of the demands placed on the worker, characterised as psychological job demands. Job demands encompass the amount of work to be completed, the speed at which work is to be done, and the timeframe for completion of the work (Sargent & Terry, 1998). The second dimension pertains to the skill discretion and decision authority available to the worker in deciding how to meet demands, combined into a single measure named decision latitude (Karasek, 1979), commonly known as job control. The model proposes that psychological strain is a consequence of the joint effects of the demands of a work situation and the decision latitude that the worker has to deal with demands (Karasek, 1979). Karasek argued that job strain results from high psychological demands and low decision latitude. Accumulated residual stress stems from the inability of a worker to adequately influence the high level of demands due to their lack of job control. Alternatively, workers with high levels of control over the demands they face are able to direct their energies into productively dealing with the situation, consequently reducing strain. Karasek also suggested that job demands are most likely a reflection of the output levels required by the organisation,
whereas decision latitude is more closely linked with the management or authority structure and the level of technology involved (Karasek, 1979).

The two-dimensional model is based on the separation of demands and decision latitude. High psychological job demands in combination with low levels of control increase the risk of psychological strain, represented by the diagonal from “low strain” to “high strain” jobs. In contrast, when high psychological demands are matched with high control in dealing with a challenge, levels of motivation, participation and learning are positively influenced.

**Expanded model**

Following further investigations involving the influence of social support in the workplace, and building on the theoretical work of Johnson and Hall (1988), Karasek and Theorell (1990) determined that the support of co-workers and supervisors was one of the most important resources in mitigating stress in the work environment. Social support is defined as the availability and quality of an employee’s relationship with supervisors, co-workers, family and friends and the amount of encouraging concern and practical advice, feedback and direct assistance received from them (Cohen & Wills, 1985; Fusilier, Ganster, & Mayes, 1986; Kottke & Sharafinski, 1988). Not only does social support facilitate active coping patterns that affect health, but the information, guidance and other forms of support provided by colleagues and managers can also affect productive behaviour. Given the importance of social support as a workplace resource, Karasek’s (1979) original model was subsequently expanded to include social support from co-workers and supervisors as a vital element in buffering the effects of psychological stressors.

The Demand-Control-Support model (DCS) (Karasek & Theorell, 1990) considers how the effects of job demand are moderated by the amount of job discretion (control) and
support available to the employee. The central feature of the model is that a job can be demanding without being stressful, provided some other aspect of the job offers resources (such as control and social support) to meet or neutralise the demands (Fletcher, 1991).

The expanded model holds that social support can facilitate productive behaviour through its contribution to effective strategies for coping with stressors. Employee productivity is also strongly emphasised as an outcome of jobs that encompass both high demands and high control (Karasek & Theorell, 1990). In terms of job (re)design, it can be deduced from the model that demands should be prevented from becoming too extreme, and control and support should be at least commensurate with the demands faced if optimal performance and productivity is to be achieved within an organisation (Kompier, 2003).

**Additive and interactive perspectives of the DCS model**

A major feature of the DCS model is that both psychological strain and active learning (characterised by labour motivation and job productivity) can be predicted using the three key variables of the model, namely job demand, job control and social support. The first perspective of the DCS model concerns the additive model, that is, where the effects associated with the component variables are independent of each other and where D, C and S have a cumulative or additive effect on employee outcomes (i.e., D + C + S).

The second perspective of the DCS model is interactive model, which focuses on interactions between the variables (i.e., D x C x S). The model proposes that social support and/or job control can moderate (buffer) the negative effects of high demands on the outcome (well-being or performance) (Karasek & Theorell, 1990). This ‘buffer’ hypothesis clearly predicts a three-way interaction of job characteristics. According to Johnson and Hall (1988) high levels of control buffer high demands most efficiently when high social support is present. It should be noted, however, that Karasek stated a multiplicative interaction term was not the central concern of the model (Karasek, 1989). It
has been argued that it is more common for the three components (psychological demands, decision latitude and social support) to separately have an effect on the outcome variables, reflecting the additive model, rather than reinforce each other as prescribed by the interactive model (de Jonge & Kompier, 1997). In two key reviews of research using the DC and DCS to investigate psychological well-being, the level of support for the additive and interactive models was compared. The authors of the first review, covering 63 studies conducted between 1979 and 1997, found moderate support for the additive effects of demand and control, and only weak support for the interactive effects of these two variables (Van der Doef & Maes, 1999). The most recent review of the DCS and psychological well-being, by Hausser and colleagues (Hausser, et al., 2010), analysed 83 studies conducted between 1998 and 2007. Again, the additive model was supported, mostly in cross-sectional studies, whereas support for interactive effects was weak.

The distinction between the two DCS models is important as the implications for interventions could differ depending on which is supported (Jones & Fletcher, 2003). If, as implied by the interactive model, resources (control and support) are found to have moderating effects on job demands, it is suggested that job control and support could be increased without the need to modify job demands (Van der Doef & Maes, 1999). On the other hand, if the additive model is supported, excessive workloads and other demands can have detrimental effects irrespective of the levels of control and support available to employees (Van der Doef & Maes, 1999).

The potential for stressors to have a positive influence on job performance was also addressed by Karasek. The active job hypothesis (Karasek, 1979) proposes that high demands can facilitate performance, provided the employee concerned has adequate resources, although this hypothesis has not been widely researched (Dollard, et al., 2001). Negative and positive relationships between workload and performance have been found
in several of the more recent studies (e.g. (Gilboa, et al., 2008; Hauser, et al., 2010; Luo, Shu-Fang, Oi-Ling, & Chang-Qin, 2010; Wallace, Arnold, Finch, Edwards, & Frazier, 2009; Wood et al., 2011). These conflicting outcomes indicate further research is necessary to understand the mechanisms through which stressors influence performance, given the potentially positive influence of stressors on performance, in contrast to well-being.

The current study acknowledges the possibility that high job demands have the potential to benefit performance, provided resources are adequate to mitigate excessive demands (Daniels & de Jonge, 2010). It is therefore necessary to examine the relationship between the DCS variables and performance in consideration of the additive and interactive perspectives of the DCS model (Karasek & Theorell, 1990). Although the current study utilises the full DCS model to investigate the effects of psychosocial conditions on performance, previous research using the DC model will be referred to where relevant to illustrate differences in findings related to the additive and interactive models. A key contribution of the current study is to clarify which model (additive or interactive) accounts for more of the variance in performance and to address the shortcomings of previous research utilising both of these models. This contribution applies equally to the DCS (Karasek & Theorell, 1990) and its predecessor, the DC model (Karasek, 1979).

**Research using DCS variables to predict performance**

The DCS model will be further explained in this section in relation to previous research investigating the effects of stressors on performance. There are some studies that have not used the DCS model, yet have drawn on one or more of the individual components of the DCS (i.e., job demands, control, support). Therefore, examples of the findings generated from the studies of individual DCS components will first be presented.
The section following will provide a review of the studies that use the DC and DCS to investigate the stressor-performance relationship, in terms of additive and interactive effects, non-linear effects, types of performance measured. Lastly, the overall findings of DCS-performance studies, along with the relevance of the DCS model for the current investigation, will be summarised.

The relationship between individual DCS variables and performance

As previously stated, the DCS has not been widely used to investigate the effect of stressors on performance, although the model does contain predictions about performance outcomes (Flynn & James, 2009). The following section will provide further detail on each of the component variables included in the DCS, in relation to job performance.

Job Demand

Job demands, also referred to as workload, encompass the amount of work to be completed, the speed at which work is to be done, and the timeframe for completion of the work (Sargent & Terry, 1998). Job demands equate to the amount of effort and attention required to adequately perform one’s job (Searle, Bright, & Bochner, 1999). High levels of job demands including workload, pressure and time urgency have been associated with decreased job performance (Boyd & Wylie, 1994; Searle, Bright, & Bochner, 2001; Searle, et al., 1999; Veloutsou & Panigyrakis, 2004; Winefield, 2000). For example, the results of a study involving university staff indicated that increasing job demands were related to decreased performance, measured as lower teaching and research standards (Boyd & Wylie, 1994; Winefield, 2000).

Conversely, recent research conceptualising stressors as either threatening goal achievement (hindrance) or facilitating one’s goals through enhanced effort (challenge) has revealed that a positive association between demands and performance is possible. In
accordance with the active job hypothesis of Karasek (1979) the challenge-hindrance stressor argument proposes that performance will increase rather than decrease when a stressor such as high workload (demand) is perceived as a challenge. In a meta-analysis of stressors’ relationships with performance, LePine and colleagues (2005) separated stressors according to whether they were perceived as challenges or hindrances in relation to job performance. Stressors categorised as challenging were job demands including workload, pressure and time urgency. It was revealed that high performers taking on additional tasks and responsibilities were motivated to perform well because high work demands were perceived as a positive challenge. According to the challenge-hindrance stressor model, a stressor appraised as a challenge leads to internal arousal which, in turn, enhances performance (LePine, et al., 2005; Wallace, et al., 2009; Webster, et al., 2010).

Job control

Job control can be considered a resource as it permits individuals to select adequate strategies for managing their tasks and attaining their goals (Binnewies, Sonnentag, & Mojza, 2009). Some of these strategies may include seeking support from others, such as work colleagues and supervisors, to assist in achieving required performance levels when personal control is low (Schaubroeck & Fink, 1998). On the other hand, workers who perceive high levels of personal control may not need support in order to perform effectively. It is possible that workers may even find support a hindrance to their active efforts at achieving performance goals, not least because support accepted may require reciprocation, which could diminish performance (Schaubroeck & Fink, 1998).

Previous research supports a positive relationship between job control and performance (Bond & Flaxman, 2006; Greenberger, Strasser, Cummings, & Dunham, 1989; Spector, 1986). The positive contribution of control to both well-being and work performance has been well-documented in the literature (Terry & Jimmieson, 1999). High
levels of job control have been related to coping with work stressors and higher work performance (Bond & Bunce, 2003; Bond & Flaxman, 2006; Jones, Huxtable, Hodgson, & Price, 2003), whereas decreases in performance can result from low or less than desired levels of control (Searle, et al., 1999). For example, a meta-analysis containing 24 studies that examined perceived employee control and supervisor-rated performance found that employees reporting high levels of control performed better than those with low levels of control (Spector, 1986).

**Social support**

Social support includes a variety of behaviours that show consideration, acceptance, and concern for the needs and feelings of work colleagues (Yukl, 1994). Social support in the workplace has been shown to have a beneficial effect on well-being (Ganster, Fusilier, & Mayes, 1986). A meta-analysis investigating the effects of social support on work stress found that perceived stressors were alleviated and levels of strain were reduced when employees received support (Viswesvaran, Sanchez, & Fisher, 1999).

The relationship between social support and performance has received less research attention, although there are some studies that have investigated the connection. One study examining the performance of door-to-door booksellers revealed a positive association between social support and financial measures of performance (Beehr, et al., 2000). In a laboratory study manipulating the conditions in which performance was undertaken, low support was found to relate to low perceived performance, although not to actual task performance (Searle, et al., 1999). This study also found that rather than being more effective, social support was less effective at increasing performance under conditions of high strain. The authors suggested that either theories proposing the moderating effects of support on high demands are flawed or, under adverse working conditions, an individual may not have the time or opportunity to utilise the social support available (Searle, et al.,
1999). In a more recent study of the effect of social support from co-workers amongst 365 Jordanian hospital nurses, perceived social support from co-workers enhanced the level of reported job performance ($r = 0.40; p < 0.001$) (Amarneh, Abu Al-Rub, & Abu Al-Rub, 2010).

There is also evidence that social support may benefit employees in handling threatening stressors, even when it does not decrease the stress experienced. The role of social support in relation to both stressors and performance was investigated in a study of hospital nurses (Kaufmann & Beehr, 1986). Supervisor and co-worker support had a significant positive relationship with job performance, whereas (counter-intuitively), social support had a negative relationship with strain-related outcomes (Kaufmann & Beehr, 1986). One explanation for this finding is that, rather than social support alleviating stressors, employees pro-actively seek support when frequent stressors are experienced. In other words, employees were able to maintain their job performance with the support of colleagues, even though the strain experienced through handling threatening stressors was not alleviated by social support. It is possible that seeking support from co-workers in order to maintain job performance served to exacerbate the threat posed by stressors, thus explaining the negative relationship between social support and strain-related outcomes.

Support from non-work sources is also an important consideration when evaluating the amount of encouraging concern and practical assistance available to employees. There is some evidence to suggest that non-work support does have an influence on job performance (Demerouti, Bakker, & Voydanoff, 2010; Sargent & Terry, 2000) although few studies include non-work support when investigating stress and performance. The current investigation addresses the tendency to overlook non-work support in studies of stress and performance by taking into account both work and non-work support within the social support component of the DCS.
The current section reviewed research focusing on the relationship between individual components of Demand, Control and Support and performance. Overall, the results of this review indicate that job control, social support from co-workers, and possibly non-work sources of support contribute positively to performance. Job strain, however, may not necessarily be alleviated by social support, despite the positive contribution that support makes to performance. Having examined studies focusing on the individual components of the DCS and performance, the following section will consider research assessing the links between additive and interactive terms and employee performance.

Relationships between additive and interactive DCS terms and performance

Unlike the previous section that examined the relationship between individual components of the DCS and performance (see pp. 50-54), this section incorporates studies that have included DC(S) additive and interactive effects in their analyses and can help establish if performance can be attributed to D+C(+S) and/or D x C or D x C x S terms. Eleven studies in total were identified; however four of these were laboratory experiments that measured an individual’s proficiency at completing highly repetitive tasks. These four experiments are not considered to provide realistic field settings and are therefore not reviewed, although they are presented in the table (under the category of experimental design) as evidence of the small number of studies utilising the DCS to investigate job performance in organisational environments. Of the remaining seven studies, two focused on the academic performance of university students, which does constitute performance of the work that students are required to do, therefore the studies were included in the review. Another of the studies utilised the DCS along with a number of additional stressors to
investigate the relationship between working conditions, well-being and performance. It is important to note that only control and support were used to predict performance in this latter study. Even though demand was not used to predict performance, the study did investigate independent and interactive effects of control and support on both in-role and extra-role performance, therefore it was included in the review. The 11 studies are presented in alphabetical order in Table 1. As can be seen in Table 1, two of the studies, one of which was longitudinal, found no significant results for either independent effects or interactions (Fox, et al., 1993; Sargent & Terry, 1998). The findings of the other five studies in the table will now be outlined in terms of: additive effects; interactive effects; mediation and types of performance investigated.
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<tr>
<td>1. Chambel &amp; Carral, 2005</td>
<td>825 university students; Portugal 176 university students; AUS</td>
<td>Cross-sectional DCS</td>
<td>Academic performance</td>
<td>Yes, control related to performance but demand and support were not</td>
<td>No</td>
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<tr>
<td>2. Cotton, Dollard &amp; DeJonge, 2002</td>
<td>176 university students; AUS</td>
<td>Cross-sectional DCS</td>
<td>Academic performance</td>
<td>Yes, demand and control were both indirectly related to performance through satisfaction</td>
<td>No</td>
<td>Included as control variables</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3. Flynn &amp; James, 2009</td>
<td>60 university students; UK</td>
<td>Experimental* DC</td>
<td>Task performance</td>
<td>Yes, demand was related to perceived performance but control was not</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4. Fox, Dwyer &amp; Ganster, 1993</td>
<td>136 nurses; US</td>
<td>Cross-sectional DC</td>
<td>Work performance</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5. Hockey &amp; Earle, 2006</td>
<td>49 university staff and students; US 128; 256 psychology students; AUS</td>
<td>Experimental* DC</td>
<td>Task performance</td>
<td>Yes, demand was related to performance but control was not</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>6. Jimmieson &amp; Terry, 1999</td>
<td>640 police officers; AUS</td>
<td>Cross-sectional DCS, organisational justice, IRB &amp; OCB</td>
<td>Work performance</td>
<td>Yes, D, C &amp; S all positively associated with performance</td>
<td>Non-linear terms included but not found for D,C or S</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>7. Noblet, Maharee-Lawler &amp; Rodwell, 2012</td>
<td>62 university admin staff; AUS 80 university admin staff; AUS</td>
<td>Longitudinal DC</td>
<td>Work performance</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8. Sargent &amp; Terry, 1998</td>
<td>214 insurance employees; US</td>
<td>Cross-sectional DCS</td>
<td>Work performance</td>
<td>Yes, control related to IRB but not OCB. Support not related to either D,C or S</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>9. Sargent &amp; Terry, 2000</td>
<td>60 psychology students; AUS</td>
<td>Experimental* DC</td>
<td>Task accuracy</td>
<td>Yes, support predicted accuracy</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*denotes experimental studies not reviewed
Additive effects

With regard to additive effects, one of the five remaining studies found no main effects of the DCS variables in relation to performance (Sargent & Terry, 2000). The other four studies did find evidence of additive effects. In a cross-sectional study of performance among 825 university students in Portugal, findings revealed that control was associated with academic performance, but demand and support were not. The study also found that satisfaction fully mediated the positive relationship between control and academic performance. The control that students had over their work had a positive effect on performance, however the effect no longer existed once satisfaction was controlled for (Chambel & Curral, 2005). The findings reflected those of the other study on academic performance included the table. Cotton, Dollard and de Jonge (2002) assessed relationships between psychosocial work characteristics including the DCS variables, well-being, satisfaction and performance among 176 Australian university students, using the DCS model in a cross-sectional study. Results revealed that both demand and control were individually associated with performance however the relationships were fully mediated by job satisfaction (Cotton, Dollard, & de Jonge, 2002). Demands were negatively related to performance and control was positively related. In a more recent investigation of the relationship between DCS variables and employee performance, study variables included organisational justice, IRB and OCB (Noblet, Maharee-Lawler, & Rodwell, 2012). Noblet and colleagues undertook a study based on a sample of 640 Australian police officers, using multiple regression analyses in a cross-sectional research design. Results indicated that a significant proportion of the variance in the outcome measures of IRB, OCB-I and OCB-O was explained by the additive effects of demand, control and support. It is important to note that increased workloads were associated with higher levels of IRB and OCB.
The final study in the table presenting evidence of additive effects was a cross-sectional investigation of stressors, health and performance outcomes among 214 US insurance employees, using the DCS model and additional variables to measure stressors, health symptoms, satisfaction, commitment, sickness absence and performance (in-role and extra-role). Results revealed that control was related to IRB but not OCB, and that support was not associated with either type of performance (Schaubroeck & Fink, 1998). (It should be noted that demand was used to predict variables other than performance in this study). Lastly, in the only longitudinal study focusing on DCS and performance that produced any significant results, no additive effects were found in a sample of 80 Australian university administrative staff (Sargent & Terry, 2000).

**Interactive effects**

In terms of interactive effects, three of the studies reviewed found evidence of interactions between DCS variables and performance. In the longitudinal study of performance among university administrative staff, a three-way interactive term involving demand, control and support predicted performance (Sargent and Terry, 2000). The result was significant for both co-worker and non-work support, and the authors concluded that the study provides evidence to support the inclusion of social support to buffer the deleterious effects of demanding work, as prescribed by Karasek and Theorell (1990). Another study that provided evidence of an interaction was the investigation of multiple stressors and multiple outcomes among a sample of US insurance employees, conducted by Schaubroeck and Fink (1998). As previously mentioned, this study used the DCS model but did not include demands in predicting performance, therefore the interaction tested was control x support and performance. Results of the two-way interaction (control x support) were significant for both IRB and OCB. Co-worker support negatively related to OCB when control was high. However there was no relationship between support and OCB
when control was low. Supervisor support was positively related to OCB and IRB when control was low rather than high. The authors suggested further research was necessary to determine whether high control necessarily leads to reduced performance in high support situations (Schaubroeck & Fink, 1998). In the study by Noblet and colleagues (2012) significant relationships were found for two of the three-way interactions. Workload x control x work support, and workload x control x non-work support, were positively associated with OCB-O. It was concluded that decision-making control and social support were important resources necessary for alleviating the burden of complex demands and, therefore, control and support were positively associated with workload and a measure of performance.

Non-linear effects

Two of the seven studies included in the review addressed the issue of non-linear effects. Cotton et al., (2002) acknowledged that a failure to detect interactive effects could be due to the existence of curvilinear effects, therefore the study was designed to control for such effects within an SEM model. There was no support for interactions after controlling for curvilinear effects. The additive model of the DCS was supported, as opposed to the interactive model. Demand, control and support combined to predict student academic performance. Although Noblet and colleagues (2012) also included non-linear terms in their research design, no significant curvilinear relationships were found between DCS variables and employee performance measures. Of the other studies examined in this review, none investigated or controlled for non-linear effects.

Mediation

Mediation was included in two of the studies presented. Both of the studies investigating the performance of university students were designed to test whether
satisfaction and psychological well-being mediated the relationship between work characteristics and academic performance (Chambel & Curral, 2005; Cotton et al., 2002). In both cases, satisfaction fully mediated the relationship between control and performance. In one of the studies, satisfaction also fully mediated the relationship between demand and performance (Cotton et al., 2002). Well-being was not found to be a mediator of the relationship between work characteristics and academic performance.

In a sample of 176 Australian undergraduate students, Cotton and colleagues (2002) assessed the relationship between psychosocial work characteristics including DCS, psychological distress and satisfaction, and academic achievement (student grades). Satisfaction was found to mediate the relationship between the student work environment and academic achievement. A similar study was later conducted by Chambel and Curral (2005) on 825 Portuguese university students. Consistent with the findings of Cotton et al., (2002), satisfaction with academic life mediated the relationship between students’ work control and their academic outcomes. Although these investigations operationalized performance in terms of students’ academic grades, rather than broader measures of in-role and extra-role performance (and only one study was longitudinal) the results suggest that there is potential for job satisfaction to have a longer term effect on the relationship between DCS and performance.

**Types of performance measured**

With regard to the types of performance measured by the studies presented, both in-role and extra-role performance were only included in two of the studies (Noblet et al., 2012 and Schaubroek & Fink, 1998). Noblet and colleagues found the additive model significant for relationships between each of the DCS variables and all three outcome measures (IRB, OCB-I and OCB-O). There was a difference between outcome measures in regard to interactive effects, with OCB-O being the only form of performance to display
significant results associated with workload, control and support (workload x control x work support; workload x control x non-work support). In the study by Schaubroek and colleagues (1998) there was a difference between IRB and OCB in terms of independent effects, with control being related to IRB but not OCB, whereas support was not associated with either IRB or OCB. On the other hand, the two-way interaction term tested (control x support) was significant for both IRB and OCB (Schaubroek & Fink, 1998). The other studies included in the table measured either academic performance or in-role performance only.

**Findings from previous DCS-performance research**

Overall, the review of studies examining the DCS-performance relationship indicated that there was support for additive effects in four of the studies and support for an interactive model in three of the studies. Only two of the studies considered possible curvilinear effects, in one case controlling for them in order to increase the possibility of detecting interaction effects, which were consequently not found (Cotton, et al., 2002). In the other case (Noblet, et al., 2012) non-linear relationships were tested but not found to be significant for DCS variables. Two of the studies tested for mediation. Support was found for satisfaction as a mediator of the relationship between work characteristics and performance, although not for well-being. Of the seven studies reviewed, only two included both in-role and extra-role performance as outcome variables. A further limitation of the DCS-performance studies reviewed was that only two of the investigations used longitudinal research designs. This shortcoming is important as a key objective of stressor-performance research is to identify the causal sequence of relationships between working conditions and employee outcomes, and longitudinal studies are necessary for this purpose (de Lange, et al., 2003).
Whilst results of the studies reviewed were mixed, there is sufficient evidence to suggest that both the additive and interactive perspectives of the DCS model are suitable for investigating the relationship between psychosocial working conditions and job performance. Given that there was insufficient testing for curvilinear relationships and potential mediators of the stressor-performance relationship among the studies identified, further investigation of this relationship using the DCS model is warranted. The inconclusive findings and small number of DCS-performance studies in the existing stressor-performance literature highlight that the DCS has been under-utilised in stressor-performance research to date.

The DCS model lends itself to being widely used in different work environments due to its simplicity and generic approach and is consequently appropriate for the current sample, which includes diverse occupations across the one public sector organisation. The DCS is particularly suitable for investigating potentially stressful psychosocial working conditions in public sector organisations and has the ability to detect interactions as well as direct effects and curvilinear relationships. These aspects of the DCS will be outlined in further detail in the next section covering areas for further investigation.

In summary, there is strong empirical and contextual evidence to suggest that the roles of demand, control and support are heightened in a public sector environment (refer pp. 43-44). Research involving civil servants has found that adverse outcomes are closely linked with job demands, decision-making control and social support; conditions captured by the DCS (Noblet, Rodwell, & McWilliams, 2006; Noblet & Rodwell, 2008). The DCS is also the most widely-used and influential model in occupational stress research, having contributed greatly to theory and research in the field (Elo, Ervasti, Kuosma, & Mattila, 2008; Ganster & Perrewé, 2011). Given its capacity and influence, the DCS is therefore an
appropriate model for use in better understanding the relationship between working conditions experienced by public sector workers, and employee performance.
Research gaps in DCS and stressor-performance literature

In addition to the small number of DCS-performance studies reviewed above, there are other studies that have investigated the stressor-performance relationship, albeit without using the DCS model. The shortcomings of this latter research are as relevant to those studies as they are to studies that have included the DCS. Therefore, the following section on the shortcomings of stressor-performance research will combine the relevant material from the broader stressor-performance literature (i.e., including and not including DCS variables). The areas covered in this section include concerns with the conceptualisation and measurement of stressors, the lack of a broad conceptualisation of job performance, investigating differential effects of stressors on performance, testing for interactions examining the role of mediators of the stressor-performance relationship, lack of research investigating curvilinear relationships, the rationale for utilising longitudinal data.

Issues with the conceptualisation and measurement of stressors

Previous research has revealed that the relationship between stressors and job performance is very complex. Among studies that have investigated the effects of a diverse range of stressors on performance, results have been mixed. For example, in a meta-analysis conducted by Muse and colleagues (Muse, et al., 2003) reviewing 52 studies on the stressor-performance relationship, 46 per cent supported the view that high job stress was associated with reduced performance; 13 per cent found the opposite and supported a positive linear relationship between stressors and performance; 4 per cent found a curvilinear relationship; 25 per cent had mixed results and 12 per cent found no relationship between stressors and performance (Muse, et al., 2003). There are a number of reasons why stressor-performance studies have identified varying results. Inconsistent
results can possibly be attributed to differences and irregularities in the various measures and conceptualisations of stressors and job performance (Jex, 1998). A wide variety of stressors have been measured in job stress research. For example, in a meta-analysis analysing 169 studies of stressors and task performance, Gilboa and colleagues (Gilboa, et al., 2008) classified the following stressors: role ambiguity; role conflict; role overload; job insecurity; work-family conflict; environmental uncertainty and situational constraints. The diverse categories of stressors, which include role-related stressors, organisational constraints and family-related stressors, are representative of the numerous conceptualisations of stressors that impact on the health of employees. Although the meta-analysis revealed a negative linear relationship between all stressors and performance in the studies included, it is difficult to discern whether the findings of all studies were comparable, due to the differing operationalisations of job stressors. Examples of these differing operationalisations include diverse measurement instruments used to assess job demands, control, decision latitude and job discretion. It should also be noted that all stressors included in this meta-analysis were associated with hindrance at work, which limits performance (Gilboa, et al., 2008). Stressors were conceptualised as negative and the prospect that stressors could potentially enhance performance was not investigated in this meta-analysis (Gilboa, et al., 2008).

**Framing stressors as adverse conditions**

The negative connotation of stressors represented in the measurement items of many job stress studies is a significant shortcoming of stressor-performance research (Muse, et al., 2003). For example, as previously mentioned, the meta-analysis by Gilboa and colleagues contained only studies that conceptualised stressors as adverse conditions that hinder or constrain performance and consequently found a negative relationship between all stressors and performance (Gilboa, et al., 2008). Another example of research
that conceptualised stressors as negative was a study of task performance among university employees, which also revealed a negative linear relationship between all stressors and performance (Jacobs, Tytherleigh, Webb, & Cooper, 2007). A further study that framed stressors as negative was an investigation of perceived pressure among scientists. Respondents were asked if they felt job pressure and could indicate as many sources of pressure as they thought applicable to them (Beauvais, 1992). Pressured scientists perceived more role strain and received lower performance evaluations than less pressured scientists (Beauvais, 1992). An earlier study of stress and performance amongst nurses defined stress as an unpleasant emotional experience presumed to lead to depression and decrements in performance, and found that stress negatively affected job performance (Motowidlo, et al., 1986). These examples illustrate that a negative conceptualisation of stressors does not allow for the possibility that the relationship between stressors and performance could be positive.

Stressors can have a positive effect on performance in certain instances (Karasek, 1979; LePine, et al., 2005; Webster, et al., 2010) and therefore measures should present questions about learning, creativity and skill level in a way that can be answered positively. Studies that contain the word “stress” bias the response towards a negative interpretation of stress (Jex, et al., 1992). The current study addresses this shortcoming through the use of survey items that do not use the word “stress”, but frame job-related conditions in terms that may be answered positively or negatively, depending on the perceptions of individual respondents.

**Measurement of both under-stressed and over-stressed conditions**

Another concern related to the design of stressor-performance research is the ability to capture both high and low levels of stress with the measurement instrument. There is a need to measure the under-stressed condition as well as the over-stressed
condition to identify the potential curvilinear relationship between stressors and performance, yet most studies do not (Muse, et al., 2003). In the meta-analysis by Gilboa and colleagues, curvilinear relationships were not explored, however the authors recommended that further research include curvilinear analyses, particularly as the association between overload and performance could be curvilinear (Gilboa, et al., 2008). Both under-stressed and over-stressed conditions should be included in studies aiming to comprehensively investigate the effects of stressors on performance (Muse, et al., 2003). To this end, researchers need to test for lack of stimulation, apathetic response or being under-challenged, in addition to the investigation of over-stimulation and its effects on performance (Muse, et al., 2003).

A further limitation of previous studies, in relation to omission of the under-stressed condition, is contextual range restriction. When there is an over-sampling of participants in jobs or professions that are considered highly stressful, a bias towards reporting high levels of strain is likely, in contrast to reporting a range of stimulation levels that include under-stimulation (Muse, et al., 2003). The current study addresses the limitation of focusing only on high-strain jobs by including a wide range of occupations in the sample.

**Narrow conceptualisation of job performance**

Performance is a complex, multi-dimensional construct that can be measured in multiple ways. Job performance not only refers to the quality and quantity of work undertaken by employees as part of their prescribed roles, but also takes into account extra-role activities (O'Reilly & Chatman, 1986) and citizenship behaviours (Smith, et al., 1983). These extra-role activities and behaviours are important in terms of an individual’s overall contributions in the workplace. Employees who work persistently, assist others and use initiative to deal with problems are more effective and positive than employees who do
not engage in these behaviours, as shown in the job performance literature (Podsakoff, et al., 1997; Podsakoff, et al., 2000; Van Scotter, et al., 2000).

Research suggests that psychosocial working conditions do not necessarily act in similar ways regarding the outcomes of OCBs and task performance (Cropanzano, Rupp, & Byrne, 2003; Fay & Sonnentag, 2002; Webster, et al., 2010). Psychosocial working conditions can have differential effects on prescribed and discretionary behaviours and, as discretionary performance impacts on workers’ ability to execute prescribed tasks, studies focusing solely on in-role behaviours may provide an incomplete assessment of the strength and nature of the relationship between working conditions and employees’ overall performance (Fay & Sonnentag, 2002; Podsakoff, et al., 2000; Webster, et al., 2010).

Demands challenge the energy levels necessary to meet the requirements of the job. Drawing on the Job Demand-Resources theory, Bakker and colleagues (Bakker, et al., 2004) propose the demands and resources that exist in employees’ working environments have differential effects on in-role and extra-role performance. As in-role behaviour (IRB) involves prescribed tasks that are objective and observable by managers and supervisors (Motowidlo, et al., 1986) employees are more likely to direct their energies towards IRB as there are penalties for not performing prescribed tasks (Conway, 1999). Extra-role behaviour (OCB), by contrast, is a reflection of the resources available to workers, specifically when control and social support are high (Bakker, et al., 2004). OCB is discretionary and therefore more variable, implying that employees can perform OCB when resources are high enough for them to engage in extra-role behaviour without threatening their performance of IRB. On the other hand, when resources are stretched, employees have more control over their capacity to withdraw from their voluntary contributions, in comparison to their prescribed tasks.
Resources, in the context of JDR, COR and DCS models, include job characteristics such as job control and social support. Such resources consist of energies and conditions that are valued by the individual, and span the work and home environments in terms of work and non-work social support. When employees perceive they have resources available and they are not currently overwhelmed by job demands, employees are likely to engage in activities focused on the organisation, in the form of citizenship behaviour directed towards individuals (OCB-I) and towards the organisation (OCB-O) (Bakker, et al., 2004). When the resources available to employees are commensurate with the demands faced, employees are more likely to go beyond their personal roles and engage in activities that advantage the organisation as a whole (Bakker et al., 2004). On the other hand, research suggests that extra-role behaviours, which are performed in addition to in-role behaviours, could be expected to diminish due to available resources being exhausted in dealing with the job stress (Bakker, et al., 2004; Turnipseed & Murkison, 2000).

The measurement of job performance is an issue when investigating the stressor-performance relationship, as the relationship is likely to vary according to the type of performance being measured. However, a gap exists in the stressor-performance literature, as the dimensionality of job performance and method of rating varies markedly between studies of job performance. For example, in the meta-analysis by Gilboa and colleagues (Gilboa, et al., 2008) task performance was measured via self-rated, supervisor-rated and objective performance data, whereas citizenship behaviours were excluded. As found in an analysis of the correlations between job performance dimensions conducted by Viswesvaran and colleagues (Viswesvaran, Schmidt, & Ones, 2005), citizenship behaviours can affect supervisory ratings of job performance even on non-citizenship dimensions of performance. Citizenship behaviours are likely to contribute to improved
performance on prescribed performance dimensions and therefore both types of performance should be taken into consideration when measuring job performance (Viswesvaran, et al., 2005). As previous research has proposed, job performance is not uni-dimensional (Motowidlo & Van Scotter, 1994; Orr, Sackett, & Mercer, 1989). Prescribed performance and discretionary performance involve different antecedents and patterns of behaviour, and consequently contribute independently to performance ratings (Conway, 1999; Motowidlo & Van Scotter, 1994). Nonetheless, multiple forms of performance (such as in-role, extra-role and counter-productive work behaviour) are rarely included in investigations of strain and performance (LePine, et al., 2005), in spite of the close association between stressful or overly demanding working conditions and an unwillingness to contribute extra energy to the organisation (Turnipseed & Murkison, 2000).

As only one of the studies using the DCS to predict performance used both in-role and extra-role performance, with the majority including only in-role performance, the lack of research on the DCS and extra-role performance is clear. Extra-role performance (OCB) is an important contributor to organisational effectiveness (Podsakoff & MacKenzie, 1994; Podsakoff & MacKenzie, 1997; Walz & Niehoff, 2000). For instance, in a longitudinal study of the effects of employee satisfaction and OCB on organisational effectiveness across a US chain of 28 restaurants, OCB significantly predicted unit-level profitability after a one year time lag (Koys, 2001). An important function of the helping behaviour which characterises OCB is that it heightens team spirit, boosts employee morale and builds social capital (Podsakoff & MacKenzie, 1997). Nevertheless, OCB has been largely overlooked in studies of job performance, with the majority of stressor-performance studies including only in-role performance as an outcome measure (see Table 1).
The need for more research that includes both prescribed and discretionary performance is clear and the current study addresses this limitation by including both types of performance in the research design. Additionally, there is a need for more employee performance studies to focus on organisations representing a range of occupations. Of the 11 studies found to investigate the DCS and performance, four of them were based on university students in laboratory experiments measuring tasks such as mail-sorting, which do not accurately reflect dynamic real-life work settings. The participants surveyed in the current study are public sector employees working in a range of administrative and support roles (e.g., human resources practitioners, training and development officers, business management, information technology, operations co-ordinations, corporate strategy, and communications) within a large state-funded law enforcement agency. Further, performance has been operationalised to include both in-role and extra-role performance.

Given the support for the differential effects of psychosocial working conditions on in-role and extra-role performance, it is important for future stressor-performance research to incorporate a broad multi-form conceptualisation of performance. The current study recognises the need to expand on the limited amount of job stress research that utilises different dimensions of performance and therefore includes both in-role and extra-role performance.

**Potential for differential effects of stressors in health and performance research**

Due to the lack of DCS research investigating performance as an outcome, the relationship between the psychosocial working conditions represented in the DCS and performance is less clear than the relationship between DCS variables and health outcomes. The link between health outcomes and the DCS has been well established and,
as already mentioned (see pp. 42-44), there are strong signs that the model may provide a useful framework for investigating both health and performance outcomes (Cotton, et al., 2002). It should be highlighted that the model specifies job demand, control and social support are fundamental in predicting both employee health and productivity (Karasek et al., 1998).

One issue that needs to be considered in relation to how psychosocial conditions influence well-being and performance is the possibility that job stressors are differentially related to these two outcomes. Although there is little research measuring the effects of stressors on performance (in comparison to well-being) there is some evidence that the direction of the stressor-performance relationship is inverse to the stressor-well-being connection (Daniels & de Jonge, 2010; Schaubroeck & Fink, 1998). Specifically, findings have revealed that stressors can have a detrimental effect on well-being but a positive effect on performance, and that surplus resources can have an adverse effect on IRB (Schaubroeck & Fink, 1998). The current study acknowledges that stressors can potentially have either a positive or negative effect on employee outcomes depending on the way in which the individual perceives the stressor and the resources available to them. In contrast to previous research that has been criticised for framing stressors as exclusively detrimental (Muse, et al., 2003), the current study takes a neutral stance in terms of the wording used in the measurement instruments. Survey participants are thereby afforded the opportunity to record a response ranging from negative through to positive.

**Testing for interactions**

One of the key predictors of the DCS is that interactions will occur between the job demands that are placed on the employee and the job-related resources (control and support) necessary to cope with such requirements (van Vegchel, et al., 2005). An aim of the current study is to test the interaction hypothesis, as most evidence suggests that DCS
variables separately predict job-related outcomes, reflecting the additive model (Fletcher & Jones, 1990; Wall, Jackson, Mullarkey, & Parker, 1996) and that support for interactions between these variables is generally mixed (Brough & Williams, 2007; de Jonge, Dollard, Dormann, Le Blanc, & Houtman, 2000; de Jonge, Reuvers, Houtman, Bongers, & Kompier, 2000).

The interactive model of the DCS focuses on synergistic relationships between the component variables (i.e., D x C x S). The model proposes that social support can moderate (buffer) the negative effects of high demands combined with low control on the outcome (well-being or performance) (Karasek & Theorell, 1990). This ‘buffer’ hypothesis clearly predicts a three-way interaction of job characteristics. According to Johnson and Hall (1988) high levels of control buffer high demands most efficiently when high social support is present.

There is evidence to indicate that an interactive model serves a valuable purpose in investigating stressors in the workplace, even though the additive model has gained more consistent support (Fletcher & Jones, 1990; Wall, et al., 1996). Following an empirical test of interaction terms in the DC model in relation to health and well-being among 405 nursing home employees, Van Vegchel and colleagues (2005) proposed that an interactive term seemed to be the most consistent representation of the relation between job demands, job resources and strain. Specifically, if it is assumed that both work overload and underload can be stress inducing, as proposed by Warr (1994), an interactive term should be used (Van Vegchel, et al., 2005).

The current study proposes that working conditions perceived by employees as either overly demanding or not demanding enough may be experienced as stressors. Although the study by Van Vegchel and colleagues used only the DC model in relation to employee well-being, the recommendation to include interaction terms could apply equally
to the DCS model and other employee outcomes, such as performance. The current study will use both the additive and interactive DCS model to investigate the stressor-performance relationship.

An important feature of the current study is that tests for DC(S) interaction will be undertaken using data from heterogeneous samples. It has been argued that interactions are more likely to be identified in studies that use heterogeneous samples (Janssen, Bakker and de Jonge, 2001). Heterogeneity is the characteristic of containing dissimilar constituents. A possible reason for the lack of interaction effects found in previous DCS research could be that many of the studies have been conducted on single organisations that do not contain sufficient differences between the study participants (De Lange, Taris, Kompier, Houtman, & Bongers, 2004; Janssen, Bakker, & de Jong, 2001). Variation in the sample population, especially on variables where there is scope for a high level of diversity between participants (e.g., occupation), should increase the chances of finding interactions if they do exist (Janssen, Bakker and de Jonge, 2001). The current study therefore utilises a heterogeneous sample that includes a wide variety of occupations, within one organisation, in order to optimise the chances of identifying interactions between the DCS variables onto performance.

The possibility of identifying interactions in stressor-performance research is also increased through including tests for curvilinear relationships. In the light of the strong theoretical support for potential curvilinear effects of stress-related conditions on performance (Muse et al., 2003), coupled with a lack of research addressing the issue (De Jonge et al., 2000), a key goal of the current study is to test for curvilinearity. Specifically, the square of a predictor (i.e., $X^2$) will be included prior to testing for an interaction between that predictor and another (i.e., $X^2Z$), as is recommended to safeguard against any significant interaction occurring due to a spurious interaction effect (i.e., an interaction
between a nonlinear and a linear predictor that may mimic an interaction, as outlined by Cortina, 1993). According to Cortina (1993) the resulting loss of power with regard to degrees of freedom is often prudent in order to achieve a substantially more appropriate test of the interaction effect.

The presence of DCS interactions is important given that implications for interventions could differ between the interactive and additive models (Jones & Fletcher, 2003). The differences in these two perspectives have ramifications for the management of stressors. If, as implied by the multiplicative model, resources (control and support) are found to have moderating effects on outcomes, it is suggested that job control and support could be increased without consequences for the level of demands (Van der Doef & Maes, 1999). A positive demand-support interaction would suggest that high job demands may enhance employee performance provided that workers have the advice, feedback, assistance and other supportive resources required to address the pace, volume and complexity of these demands. In this case, the demands faced by employees need to be closely monitored and interventions should focus on ensuring that the quality and timeliness of the support match the specific demands faced by employees. For example, there is evidence to suggest that when workload and time pressure match the types of control directly related to these demands (i.e., control over task, timing, scheduling, or pacing) there is a greater likelihood that significant interactions will be found (Hausser, et. al., 2010). In contrast, if the additive model is supported, increasing the level of control (and/or social support) would not be sufficient to improve outcomes, given that high demands, exclusively, have a detrimental impact on employees (Van der Doef & Maes, 1999).
Potential mediators of the stressor-performance relationship

The occupational stress literature commonly examines the direct association between stressors and performance (e.g., Jamal, 2007; LePine, et al., 2005; Muse, et al., 2003). This practice however, overlooks important intermediary influences such as the individuals’ attitudinal or psychological responses to the job and the social and organisational contexts in which the job is undertaken (Cooper, 2008; Fried, Shirom, Gilboa, & Cooper, 2008; Jex, 1998). Mediated models of the stressor-performance relationship posit that exposure to chronic job stressors such as excessive job demands or inadequate job control do not result in immediate fluctuations in job performance, but first negatively affect important attitudinal and psychological antecedents of job performance, including job satisfaction and psychological well-being (Cooper, 2008; Fried, et al., 2008; Jex, 1998).

A mediator variable is one that transmits an effect, but does not change the nature of that effect (Baron & Kenny, 1986). Research employing mediator variables investigates the pathways linking the predictor and outcome variables (Baron & Kenny, 1986). In relation to the stressor-performance relationship, understanding these pathways has important theoretical and practical implications. From a theoretical standpoint, identifying the mechanisms through which working conditions influence performance can help to explain how job stressors might undermine employee performance (Cooper, 2008; Fried, et al., 2008; Jex, 1998). Fletcher’s model of job stress proposes that attitudinal (e.g., job satisfaction and commitment) and health-related variables (e.g., psychological distress and psychological well-being) are intermediary mechanisms in the relationship between job stressors and longer term health and performance outcomes (Fletcher, 1988). In more practical terms, identifying these mechanisms then allows organisations to monitor the intermediary variables and, where necessary, to take action to address job stressors before
they impact on employee performance (Bakker, et al., 2004; Beal, et al., 2005). Likewise, specifying the mediating variables can help managers determine the type of action that is required. While both adverse attitudinal and health-related responses would support the need for primary prevention strategies that seek to modify the work-based sources of job stress, heightened psychological responses (e.g., psychological distress) would also indicate that secondary and/or tertiary interventions would be needed to strengthen employees’ coping capacities and to help them make a quick return to effective psychological functioning (DeFrank & Cooper 1987).

Despite the importance of understanding the mechanisms through which job stressors influence employee performance, these intermediary mechanisms have generally been overlooked in the stressor-performance research (Cooper, 2008). There is furthermore, the need to investigate mediating attitudes and psychological responses has been recognised as an important gap in stressor-performance research (Cooper, 2008; Gilboa, Shirom, Fried, & Cooper, 2008; Jex, 1998). The current study will therefore assess the extent to which two attitudinal variables (job satisfaction and organisational commitment) and two health-related variables (psychological well-being and psychological distress) mediate the relationship between psychosocial working conditions and employee performance.

**Job satisfaction**

Job satisfaction is defined as an employee’s attitude towards their job, as assessed by their evaluation of job features or characteristics, emotional responses to events that occur on the job, and job-related intentions (Locke, 1976). As one of the most widely-researched variables in industrial-organisational psychology (Jex & Britt, 2008), job satisfaction has been examined as both an outcome of job stressors such as the DCS variables (e.g., Brough & Frame, 2004; Mansell & Brough, 2005) and as an antecedent of
job performance (e.g., see (Bowling, 2007; Judge, Thoresen, Bono, & Patton, 2001) for meta-analytic reviews). In comparison, a small but growing number of studies have directly examined the extent to which job satisfaction mediates the stressor-performance relationship (Anton, 2009; Jacobs, et al., 2007; Webster, et al., 2010). This latter research suggests that the negative affect associated with stressful working conditions may be transmitted, at least in part, via people’s satisfaction with their jobs.

**Affective commitment**

Another key job attitude that is likely to mediate the stressor-performance relationship is organisational commitment, which refers to an employee’s attachment to the organisation (Meyer & Allen, 1991). The most widely researched form of organisational commitment, affective commitment (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), is characterised as “an emotional attachment to, identification with, and involvement in the organisation” (Meyer & Allen, 1991)p. 67). Organisational commitment has been found to influence the level of effort that employees apply to their jobs (Chong & Eggleton, 2007; DeCotiis & Summers, 1987; Nouri & Parker; Teo & Waters, 2002). Positive job behaviours, including performance, are demonstrated by employees being highly committed to the organisation (Tett & Meyer, 1993). Low levels of organisational commitment, on the other hand, have been shown to manifest as withdrawal behaviours including exerting less effort on the job and ignoring work tasks, resulting in impaired in-role and extra-role performance (Anton, 2009; Cropanzano, et al., 2003; Jamal, 1985). Not only is organisational commitment seen as an important precursor to employee performance but it is also a commonly referred to outcome of key job characteristics such as those represented in the DCS. Together, this research suggests that declining commitment may be an important pathway through which working conditions influence worker performance.
Psychological well-being and psychological distress

In addition to the evidence that attitudinal variables (job satisfaction and commitment) predict performance, psychological well-being has also been shown to affect organisational outcomes, including employee performance. Psychological well-being, also termed psychological health, is generally characterised as the overall effectiveness of an individual’s current psychological functioning (Wright, 2005). Aspects of psychological well-being include effective psychological functioning, which is concerned with confidence, enjoyment, and the ability to concentrate; and ineffective functioning manifested as psychological distress, which is focused on anxiety and depression (Goldberg & Williams, 1988; Kessler et al., 2002).

Psychological well-being, which has long been studied as an outcome of job stressors (De Lange, et al., 2004; Ganster & Murphy, 2000; Van der Doef & Maes, 1999), is also an important factor contributing to organisational outcomes including performance (Wright & Cropanzano, 2000). An increasing number of studies have examined psychological well-being in relation to performance outcomes. Research has shown that psychological well-being is associated with job performance even after demographic variables such as employee age, tenure and education level are controlled for (Cropanzano & Wright, 1999; Donald, et al., 2005; Staw, Sutton, & Pelled, 1994; Wright & Bonett, 2002). In contrast, the dysfunctional aspect of psychological well-being, psychological distress, has been shown to have a negative association with performance. High levels of job stress result in symptoms of psychological distress (Ivancevich & Matteson, 1980) which, in turn, have a negative impact on employees ability to perform work tasks (Cooper & Dewe, 2008; Motowidlo, et al., 1986; Quick, Quick, Nelson, & Hurrell, 1997).

Further investigation of how attitudinal and psychological responses transmit the effects of environmental conditions on to employee performance would significantly
improve knowledge of how stressors influence performance in the workplace (Gilboa, et al., 2008; Singh, 2000). The current investigation posits that job satisfaction, affective commitment, psychological well-being and psychological distress are intervening variables in the stressor-performance relationship. Through conducting the relevant tests for mediation, the current study seeks to clarify the specific mechanism through which working conditions can influence employee performance.

**Lack of research investigating curvilinear relationships**

A key aim of the current study is to address the lack of DCS research examining non-linear relationships which has been identified as a shortcoming in the existing job stress literature (de Jonge, Dollard, et al., 2000; De Lange, et al., 2004; Hausser, et al., 2010; Muse, et al., 2003; Rydstedt, et al., 2006). The majority of work stress studies assume that a linear relationship exists between independent predictors and the principal outcomes or dependent variables (e.g., Brief & Motowidlo, 1986; Donald, et al., 2005; Gilboa, et al., 2008; Jacobs, et al., 2007). The association between psychological work demands or occupational resources and employee outcomes is, however, likely to be far more complex than the simple linear and additive models used in many job stress studies suggest. The lack of DCS research examining possible non-linear relationships is in contrast to Karasek's original model of job strain (1979) which acknowledged that neither too much nor too little strain was favourable to the individual (1979). In turn, this non-linear perspective is consistent with the stress model of Selye (1956) and the earlier landmark performance theory of Yerkes and Dodson (1908). These “inverted-U” models of stress and performance (Selye, 1956; Yerkes & Dodson, 1908) hold that a certain level of stress is necessary for optimal performance. Importantly though, increasing the level of stress beyond a particular point has deleterious effects. The level of stress increasing from low towards an optimal level, after which point performance is negatively affected, can be
represented by graphing the results to form an inverted-U shaped curve. This inverted U-shaped curve applies to the earlier stress theories of Yerkes and Dodson (1908) and Selye (1956), in addition to the later theories of Gardner (1986) and Warr (1987; 1990a).

According to the Vitamin Model (Warr, 1987; 1990a) and also Gardner's (1986) Activation Theory, the boredom and lack of stimulation associated with low levels of job performance arise from insufficient levels of activation. On the other hand, increased activation is associated with higher alertness, positive emotion and better performance (Gaillard, 1993; Gardner, 1986). After activation has increased beyond the optimal threshold, however, further activation results in mental overload, and diminished performance (Gaillard, 1993; Gardner, 1986).

As these theories of under and over-stimulation propose, it is possible that a curvilinear relationship exists between stressors and resources (e.g. demands, control and support) on the one hand and performance on the other (e.g., in-role and extra-role behaviours) (Gardner, 1986; Selye, 1956; Warr, 1987; 1990a; Yerkes & Dodson, 1908), where an under or over-supply of any of the DCS variables can be harmful to employee outcomes. For example, in relation to social support, the amount of guidance and feedback that employees can process is limited, therefore excessive levels of social support may be detrimental to effective performance, just as inadequate levels of support have negative impacts on employee outputs (Varvel et al., 2007). There are a limited number of studies that have empirically tested potential curvilinear relationships between the components of the DCS model and employee health or performance outcomes. Some evidence of curvilinearity has been found in relation to job demands (Warr, 1990a), job control (Fletcher & Jones, 1990) and work-based social support (de Jonge & Schaufeli, 1998; Varvel, et al., 2007). In a review specifically designed to determine whether curvilinear relationships between stressors and performance (the inverted U-shaped curve) had been
adequately tested, Muse and colleagues found that only four per cent of the 52 studies reviewed detected curvilinear relationships (see (Muse, et al., 2003). The authors identified a series of flaws in the methodology of most of the studies reviewed, concluding the small number of curvilinear relationships detected may be due to inadequate research design, rather than an actual lack of such relationships (Muse, et al., 2003).

The shape of the stressor-strain relationship, in terms of linearity, has important implications for the management of stressors in the workplace (Hamidi & Eivazi, 2010; Karanika-Murray, 2010). Where a linear relationship between stressors and performance outcomes is identified, the appropriate stress management intervention would be to reduce stressors and maximise positive job characteristics (Rydstedt et al., 2006). On the other hand, a curvilinear relationship indicating critical points where the influence of stressors level off or decrease would imply that determining optimal levels of stressors has practical value (Muse, et al., 2003). In identifying the point where beneficial work characteristics can become detrimental for health or performance, it is recognised that risk can change contingent on an individual employee’s experience with a certain working condition (Karanika-Murray, 2010). If results reveal that perceptions and levels of stressors differ between people, an individual-level approach to performance management should be adopted. Alternatively, if high levels of stressors are widely experienced as detrimental to performance, group-level intervention is appropriate (Dollard, Winefield, Winefield, & de Jonge, 2000; Karanika-Murray, 2010; Macklin, et al., 2006).

In practical terms, curvilinear relationships that display an inverted-U pattern have considerably different implications for management practice than curvilinear relationships that display a ceiling effect or a U-shape (Karanika-Murray, 2010), yet there is limited stressor-performance research investigating curvilinear relationships (Muse, et al., 2003). The lack of research examining the ways in which working conditions influence
performance has important implications for how organisations should manage stress-related working conditions in order to optimise performance outcomes. For example, a positive linear relationship between co-worker support and performance would mean that organisations should intervene where support is low. However an inverted-U shaped curvilinear support-performance relationship suggests interventions should target both high and low-support conditions. On the basis of this gap in the literature, a key aim of the current research is therefore to test the potential for nonlinearity amongst the DCS variables when predicting both in-role and extra-role performance. The study also aims to add to the literature with respect to longitudinal designs and curvilinearity, by testing non-linear terms using time-lagged data.

The rationale for utilising longitudinal data

An important objective of work stress research is to identify the causal sequence of the relationships between working conditions and employee outcomes (de Lange, et al., 2003). Researchers have acknowledged that cross-sectional designs can only demonstrate correlations between variables, and that correlations are not causal relationships (Taris & Kompier, 2003). Longitudinal research designs that include testing for reverse causal and reciprocal relationships can help develop stronger conclusions about the causal relationships between study variables than the findings from cross-sectional studies (Taris & Kompier, 2003).

The need for longitudinal investigations is particularly relevant in the case of DCS research. When reviewing previous research involving the DCS, de Lange and colleagues (2003) noted that 53 of the 63 studies reviewed in the seminal meta-analysis conducted by van der Doef and Maes (1999) used cross-sectional designs, which do not help clarify the sequential order of the variables (de Lange, et al., 2003). It is also not possible to establish the direction of the relationship between study variables in a cross-sectional study. Most
work stress models, including the DCS model, assume the relationship between psychosocial working conditions and employee outcomes is unidirectional (de Lange, Taris, Kompier, Houtman, & Bongers, 2005). However, the relationship between work and strain can also be explained by reversed causal relationships. For example, workers may perceive their jobs differently over time and judge the demands they face as more strenuous as a consequence of their resources being depleted (Taris & Kompier, 2003). Additionally, associations between work and strain can be due to bi-directional or reciprocal relationships where both normal and reversed causal relationships exist (Hurrell & Murphy, 1996). There is some evidence to support reciprocal causal relationships between DCS variables (demands, control, and social support) and mental health outcomes including depressive mood, job satisfaction and emotional exhaustion (De Lange, et al., 2004).

**Testing for reverse and reciprocal effects**

Reciprocal and reverse causal relationships should be controlled for, as they could offer alternative explanations for associations between particular variables (de Lange, et al., 2005). De Lange and colleagues (de Lange, et al., 2005) conducted a longitudinal Dutch study involving 1588 participants which revealed that work characteristics and mental health influenced each other reciprocally (de Lange, et al., 2005). The authors found that the relationship between health and work characteristics does not apply to all employees in the same manner, as people differ in their perceptions and behaviour with regard to encountering stressors. It is important to note that these results apply to health outcomes whereas the current study investigates performance outcomes. However, the argument for testing reverse causal relationships is equally relevant to performance.

In order to explore reciprocal causal relationships, in which variable X (e.g., psychosocial working conditions) and Y (e.g., performance) mutually influence each other,
a longitudinal design is necessary (Zapf, Dormann, & Frese, 1996). Testing for reverse causal and reciprocal relationships in the current study will also be applied to the association between mediating variables (job satisfaction, commitment, psychological well-being and psychological distress) and performance. The possibility of reverse causal and reciprocal relationships between job attitudes (job satisfaction and commitment) and performance (in-role and extra-role) was investigated in a meta-analysis of 16 studies that recurrently measured performance and job attitudes (Riketta, 2008). Although the evidence was not strong, results suggested that job attitudes are more likely to influence performance than the other way around.

The heavy reliance on cross-sectional study designs and the uncertainty these raise over the sequential direction and longer-term stability of the identified relationships is a shortcoming of research examining the links between stress-related working conditions and performance. Furthermore, there is a clear need for stressor-performance research to be based on longitudinal designs that can demonstrate if and how the performance-related effects attributed to psychosocial working conditions remain over longer time periods and to test for reverse causal and reciprocal relationships. Given that there is a case for testing reverse causal relationships among psychosocial work characteristics, attitudinal variables and performance, and that such testing is not generally undertaken, the current study will address this gap in the research by conducting reverse causal analyses in a longitudinal design.

**Time lags in longitudinal studies**

The estimation of correct time lags is an important aspect of designing a longitudinal study. A key reason that longitudinal studies might fail to find significant results between DCS variables and employee outcomes, could be that effects may take place within a few months rather than periods of a year or more (DeJonge et al., 2001). A
further reason is that employees have the ability to anticipate the future and the reoccurrence of stressful situations, and they can act to prevent this provided they have the opportunity to do so (Fay & Sonnentag, 2003). If this is the case, conditions will vary at each time point in the study and relationships may not hold over time. However, it should be noted that even though a time lag that is too long can lead to an underestimation of the true causal impact of stressors, time lags that are too short may infer that no causal effects exist at all (Zapf, et al., 1996). Therefore, periods of longer than a year are recommended, and that is the reason behind the length of the time lag in the current study, which is 18 months.

In summary, findings from previous DCS-performance research suggest that there are strong empirical grounds for including the DCS in investigations of the stressor-performance relationship. Further, it has been argued that research in the area of job stress is often not anchored in an over-arching framework (Abdollahi, 2002; Wood, et al., 2011) and that future research should be based on a sound theoretical framework such as the “very well-established model of occupational stress” that is the DCS (Wood et al., 2011, p. 1067). Importantly, the DCS stipulates the particular job characteristics (i.e., job demands, control/decision latitude, and social support) that can make significant contributions to the stressors experienced by employees (Ganster & Perrewé, 2011). Having outlined the foundations for using the DCS to guide the current investigation, the remainder of Chapter 2 will focus on the study aims, hypotheses and contributions of the investigation.

**Study Aims, Hypotheses and Contributions**

The preceding sections in this chapter have outlined important limitations in the existing DCS-performance research. Specifically, there is a clear need to gain a more detailed understanding of the strength and direction of the relationship between job
Previous sections of the chapter also established that the DCS is an appropriate conceptual framework for examining potential connections between stressors and performance. The following section will draw on this and other research to develop a set of hypotheses that will be tested using a comprehensive set of statistical analyses. A summary of the contributions of the current research will be presented in the final section of the current chapter.

**Study Aims**

In light of the paucity of research addressing the association between stress and performance, the overall aim of the current investigation is to identify the relationships between the DCS variables and multiple forms of employee performance in a public sector organisation. A key goal of the study is to investigate the possibility that certain types of performance may be more or less susceptible to specific working conditions represented in
the DCS and hence worker performance has been operationalised to include both in-role and extra-role measures.

Given that researchers using the DCS model have found evidence of interaction and/or additive effects (e.g., de Jong and Dormann, 2006) and both linear and non-linear pathways (e.g., Rydstedt et al. 2006), there are indications that important information on the stressor-performance relationship may be overlooked unless a thorough approach to assessing the DCS-performance relationship is undertaken (Muse et al., 2003). Another important goal of the current study is therefore to undertake a comprehensive assessment of the DCS that takes into account direct, indirect and non-linear effects in examining the relationship between the DCS variables and employee performance. Further, all analyses will be undertaken within a cross-sectional and longitudinal panel design, which includes hierarchical regression analyses to assess the sequential order of the variables.

The above analyses will also consider the extent to which the relationship between the DCS and the performance measures is mediated by attitudinal and health-related variables (i.e., job satisfaction, affective commitment, psychological well-being and psychological distress). Together with the tests for curvilinear and interaction effects, these latter analyses will help clarify how and under what conditions job characteristics influence worker performance. As job performance is so critical to the viability of organisations, studies that can identify the conditions impacting on worker performance can play a key role in strengthening organisations’ commitment to developing and supporting initiatives to change those conditions. Highlighting the implications of stressful working conditions for employee performance, productivity, error rates and other organisational outcomes can help senior managers and other organisational leaders endorse ongoing stress prevention strategies (Murphy & Sauter, 2003). A productive organisation cannot be achieved at the expense of employees’ well-being, however,
satisfied employees can add little value to an organisation unless they are performing
efficiently and productively (Griffin, et al., 2000; Hart & Cooper, 2001). This study aims
to help develop a greater understanding of the association between psychosocial working
conditions and task and contextual performance and assess the value of using the DCS
model to examine employee performance in future studies.

The specific hypotheses to be tested in the current investigation are presented in the
following section. Each set of hypotheses will be preceded by a brief explanation of the
rationale behind the expected relationships that draws on findings from the aforementioned
literature review.

**Hypotheses 1 and 2: Independent effects predicted by the DCS model**

The independent effects of the DCS (additive) model have been strongly supported
in the job stress research. There have been three major reviews of research testing the
efficacy of the DCS model in predicting various health and well-being outcomes (de Lange
et al., 2003; Hausser et al., 2010; Van der Doef & Maes, 1999). One of the key aims of
each of these reviews was to compare the amount of support for both the additive and
interactive models of the DCS in order to determine which version of the model was more
effective in predicting well-being outcomes. The first of the reviews by Van der Doef and
Maes (1999) covering 63 studies during the period from 1979 to 1997, found that there
was extensive support for the additive model. The second of the DCS reviews, conducted
by de Lange and colleagues (de Lange et al., 2003) evaluated only high quality
longitudinal studies between 1979 and 2000, numbering 19 out of a possible 45 studies.
Once again, evidence for the additive model was consistent. The most recent of the DCS
reviews, by Hausser and colleagues (Hausser et al., 2010) focused on the period between
1998 and 2007, covering 83 studies. Findings revealed strong support for the additive
effects of demand, control and support on psychological well-being in most cross-sectional
studies, with weaker results in longitudinal studies. Among several possible explanations for the weak evidence of additive effects in longitudinal studies is that reciprocal and reverse causal relationships could have been operating between the variables, but were not tested for.

Although there is a lack of research using the DCS model to predict performance, there are strong signs that a relationship between the component variables exist (Bakker, et al., 2004; Muse, et al., 2003). There is also strong support for the additive effects of demand, control and social support in relation to employee well-being outcomes in previous DCS research (de Lange et al., 2003; Hausser et al., 2010; Van der Doef & Maes, 1999). In view of these findings, the predictions of the DCS will be extended to employee performance in the current study. The additive model proposes that demands, control and support will independently predict employee outcomes and also that the combination of D, C & S, (the additive model as a whole, measured by the change in $R^2$) will explain a significant amount of the variance in employee outcomes (Karasek & Theorell, 1990). Given the inconsistent findings of limited DCS-performance research to date, in addition to theory and evidence suggesting that the DCS may conversely affect well-being and performance, specifically in relation to demands (DeJonge et al., 2010; Karasek, 1979; Karasek & Theorell, 1990) an objective of the current study is to clarify the contribution of independent DCS effects to job performance. A major focus of the study is to determine the amount of variance in performance explained by each version of the DCS model (additive vs interactive). The direction of the relationships will of course be revealed by these analyses and subsequently discussed in detail. The following hypotheses are therefore proposed:

**Hypothesis 1:** Demand, control and support will each be significantly associated with employee performance.
**Hypothesis 2:** The additive DCS model will capture a significant proportion of the variance in employee performance.

**Hypotheses 3 and 4: Independent effects of DCS on multiple measures of performance**

Performance is a multi-dimensional construct, which can be measured in many ways. Further, the stressor performance relationship is likely to vary according to the type of performance being measured. Research suggests that all work stressors do not act in similar ways regarding the outcomes of OCBs and task performance (Webster, Beehr, & Christiansen, 2010). In a meta-analysis of studies on various work demand stressors and job performance, the authors found evidence that different stressors had differential relationships with performance, and concluded that there is a need to further theorise and examine the reasons for differential associations (Gilboa et al., 2008).

Stressful conditions can have a negative impact on performance as they drain people’s energy and trigger emotional fatigue, which reduces the mental resources required for individuals to perform work tasks effectively (Barnes & Van Dyne, 2009; Gilboa, et al., 2008). Through averting attention and energy away from performing job functions in order to cope with work-related stressors, it is expected that an individual’s ability to perform will be reduced (Jex, 1998). In addition, when work demands exceed available resources available to meet them, the overload could be considered a threatening stressor with a deleterious impact on performance, due to the inadequate resources necessary to both deal with the stressor and complete the task (Gilboa, et al., 2008).

Drawing on the JD-R theory, Bakker et al., (2004), propose the demands and resources that exist in employees’ working environments have differential effects on in-role and extra-role performance. In-role behaviour (IRB), involves prescribed tasks that are
objective and observable by managers and supervisors (Borman & Motowidlo, 1997; Motowidlo & Van Scotter, 1994). Employees will primarily direct their energies towards IRB as there are penalties for not performing prescribed tasks (Van Scotter, et al., 2000). Extra-role behaviour, by contrast, is a reflection of the resources available to workers, specifically when control and social support are high. OCB is discretionary and is therefore more susceptible to fluctuations in control and support. The variability between IRB and OCB is largely due to employees having more control over their capacity to withdraw from their voluntary contributions, when resources are stretched, in comparison to their prescribed tasks.

Previous research suggests that extra-role behaviours, which are performed in addition to in-role behaviours, could be expected to diminish due to available resources being exhausted in dealing with the job stress (Bakker, Demerouti, & Verbeke 2004; Turnipseed & Murkison 2000).

In line with predictions of the resources-based stress models that include the DCS, and previous research findings supporting a withdrawal of extra-role performance in response to reduced resources, the following hypotheses are proposed:

**Hypothesis 3:** Demand, control and support will be significantly associated with both IRB and OCB.

**Hypothesis 4:** An additive model will explain more of the variance in OCB than in IRB.

**Hypotheses 5 and 6: Interactive effects predicted by the DCS model**

One of the hallmarks of the DCS is the interaction hypothesis (i.e., demand x control x support). This hypothesis proposes that the influence of job demands is heavily dependent on the extent to which control and social support are available to address the demands (Karasek & Theorell, 1990). Although research has demonstrated associations
between both job demands and worker control in regard to occupational stress (Jackson et al., 1993) reports of demand-control interactions across a range of outcomes in the workplace have been inconsistent (Brough & Williams, 2007; de Jonge et al., 2000; de Jonge, Reuvers et al., 2000). Often, no interactions among the effects of demand, control and support are found, as shown in a study of workplace learning (Ouweneel et al., 2009). Consistent with other studies focusing on single organisations, rather than population-wide epidemiological data, results indicated that demand, control and support were more likely to operate independently of each other, as predicted by the additive model (e.g., Bond and Bunce 2003; De Lange et al. 2003).

Although most DCS research is based on health (well-being) outcomes, a small number of studies have utilised the model to investigate performance. Of the studies that have used the full DCS to examine the stressor-performance relationship, one of the studies (Sargent & Terry, 2000) supported the interactive model. A significant result was found for the three-way interaction of demand x control x support and performance (for both co-worker & non-work support).

Whilst the DCS theory proposes that an interactive model should explain additional variance when investigating the outcomes of psychosocial working conditions, as can be seen from the examples provided, there is weak evidence supporting the interactive model. A possible reason for the lack of interaction effects found in previous DCS research could be that many of the studies have been conducted on single organisations that do not contain differences in the sample (Janssen, Bakker and de Jonge, 2001). Variation in the sample population, such as types of occupation, should increase the chances of finding interactions if they do exist (Janssen, Bakker and de Jonge, 2001). The current study therefore utilises a heterogeneous sample that includes a wide variety of occupations,
within one organisation, in order to optimise the chances of identifying interactions between the DCS variables onto performance.

In order to test comprehensively for interactions between the DCS variables and performance, the current study will include two-way interactions between the variables, in addition to three-way interactions, thereby testing two interactive versions of the model. Based on this aim, the following hypotheses have been formulated:

**Hypothesis 5:** A two-way interactive model (D x C, D x S, C x S) will explain additional variance in employee performance over an additive model (interactions in addition to independent effects).

**Hypothesis 6:** A three-way interactive model (D x C x S) will explain additional variance in employee performance over an additive model (interactions in addition to independent effects).

**Hypothesis 7: Curvilinear effects**

In addition to the lack of stressor-performance research testing for DCS interactions, the tendency to overlook possible non-linear relationships has been identified as a shortcoming of job stress research using this model (de Jonge, Reuvers, et al., 2000; de Lange, et al., 2003; Muse, et al., 2003). There is both theoretical and empirical evidence to suggest that the relationship between working conditions and performance may be non-linear. Linear relationships between job stress and organisational variables suppose that low levels of stressors are always preferred to high levels of stressors (Rose, 1992; Warr, 1990b). However, parallel to the stress model of Selye (1956) and the earlier landmark performance theory of Yerkes and Dodson (1908), Karasek acknowledged that neither too much nor too little strain was favourable to the individual (1979).

Although studies testing curvilinear relationships between DCS variables and employee outcomes are rare, there is a growing body of empirical research demonstrating
significant curvilinear relationships between job demands, job autonomy, and social support on one hand, and job satisfaction, emotional exhaustion and anxiety on the other (De Jonge and Schaufeli 1998). For example, in a study examining the relationship between work-based social support and stress in a sample of 53 U.S. fire-fighters, a curvilinear pattern was found. For individuals perceiving the lowest levels of support there was a strong negative association with stress, however, for participants scoring above the median the association was not significant (Varvel et al. 2007). This finding emphasises that the favourable effects of support are tempered at high levels and further diminished at very high levels. In another example of a curvilinear research design, a longitudinal study of the DCS onto health outcomes among 1,739 employees in Holland showed that a curvilinear model was superior for predicting emotional exhaustion and depression, whereas a linear additive model was supported for job satisfaction and sickness absence (DeJonge et al., 2000). Further evidence of a curvilinear relationship between DCS variables and strain indicators exists in a study of 4000 employees in the Dutch working population (van der Doef & Maes, 2000).

Given the strong theoretical reasoning underpinning the inverted-U hypothesis, and the mounting empirical evidence of curvilinear effects for DCS studies of health outcomes, it is important to include analyses that will identify curvilinearity in studies aiming to clarify the relationship between stressors and employee outcomes, including job performance (Muse, et al., 2003; Rydstedt, et al., 2006). There are strong grounds to suggest that the relationship between psychosocial working conditions and performance may be non-linear. With this rationale in mind, the following hypothesis will be tested:

**Hypothesis 7**: The relationship between job demands, job control and social support and employee performance will be non-linear.
Hypothesis 8: Potential mediators of the stressor-performance relationship

An area of stressor-performance research that has received little attention is the behavioural, cognitive and psychological mechanisms through which stressors affect performance. Researchers in the field of occupational stress and performance have suggested that the common practice of relying strictly on direct effects to predict performance overlooks the important indirect influences of individuals’ psychological responses to their job (Cooper, 2008; Gilboa, Shirom, Fried, & Cooper, 2008; Jex, 1998). These indirect influences operate as mediating variables, which transmit an effect, but do not change the nature of that effect (Baron & Kenny, 1986). A mediated model of the stressor-performance relationship posits that exposure to chronic job stressors, such as excessive job demands or inadequate job control, do not result in immediate fluctuations in job performance, but first negatively affect important attitudinal and psychological antecedents of job performance, including job satisfaction and psychological well-being (Cooper, 2008; Fried, et al., 2008; Jex, 1998).

Understanding the pathways between predictor and outcome variables has important theoretical and practical implications in terms of the stressor-performance relationship. Identifying the mechanisms through which working conditions influence performance can help to explain how job stressors might undermine employee performance (Cooper, 2008; Fried, et al., 2008; Jex, 1998). Upon identifying these mechanisms, organisations can monitor the intermediary variables and, where necessary, to take action to address job stressors before they impact on employee performance (Bakker, et al., 2004; Bakker, et al., 2008; Beal, et al., 2005). Specifying the mediating variables can also help managers determine the type of action that is required. While both adverse attitudinal and health-related responses would support the need for primary
prevention strategies that seek to modify the work-based sources of job stress, heightened psychological responses (e.g., psychological distress) would also indicate that secondary and tertiary interventions would be needed to strengthen employees’ coping capacities and to help them make a quick return to effective psychological functioning (DeFrank & Cooper 1987).

The need to investigate mediating attitudes and psychological responses has been recognised as an important gap in stressor-performance research (Cooper, 2008; Gilboa, Shirom, Fried, & Cooper, 2008; Jex, 1998). The current study will therefore assess the extent to which two attitudinal variables (job satisfaction and organisational commitment) and two health-related variables (psychological well-being and psychological distress) mediate the relationship between psychosocial working conditions and employee performance. Job satisfaction has already been identified as a mediator in a small number of stressor-performance studies (Anton, 2009; Jacobs, et al., 2007; Webster, et al., 2010). There are strong indications that organisational commitment (Anton, 2009; Cropanzano, et al., 2003; Jamal, 1985), psychological well-being (Cropanzano & Wright, 1999; Donald, et al., 2005; Staw, et al., 1994; Wright & Bonett, 2002) and psychological distress (Cooper & Dewe, 2008; Motowidlo, et al., 1986; Quick, et al., 1997) also represent important intermediary mechanisms in the pathways between stress-related working conditions and employee performance. Based on this line of reasoning, the following hypothesis has been formulated:

**Hypothesis 8:** Attitudinal variables (job satisfaction and affective commitment) and health-related variables (psychological well-being and psychological distress) will mediate the relationship between working conditions and performance
Hypotheses 9 and 10: Longitudinal & reverse causal effects

An important objective of work stress research is to determine the causal sequence of the relationships between working conditions and employee outcomes, in order to gain a greater understanding of the mechanisms that operate between the variables of interest. Longitudinal research designs provide stronger conclusions about the causal relationships between study variables than the findings from cross-sectional studies (Taris & Kompier, 2003). Researchers have acknowledged that cross-sectional designs can only demonstrate correlations between variables, and that correlations are not causal relationships (Taris & Kompier, 2003).

The point that cross-sectional studies are inadequate for drawing conclusions about causal relationships between study variables has been made in regard to DCS research in particular. When reviewing previous DCS research, de Lange and colleagues (2003) emphasised that 53 of the 63studies reviewed in the seminal meta-analysis conducted by van der Doef and Maes (1999) used cross-sectional designs, which cannot provide confirmation of the sequential order of the variables (de Lange, et al., 2003). It is also not possible to establish the direction of the relationship between study variables in a cross-sectional study. In view of the limitations of cross-sectional studies, longitudinal designs, that compare data at more than one time point, offer more scope for examining causal processes. Longitudinal research designs offer the opportunity to generate and test innovative ideas, such as the issue of reciprocal effects and non-linear relationships, rather than merely replicate existing insights (Taris & Kompier, 2003).

In order to explore reciprocal causal relationships, in which variable X (e.g., psychosocial working conditions) and Y (e.g., performance) mutually influence each other, a longitudinal design is necessary. According to de Lange and colleagues (de Lange, et al., 2005) reciprocal and reverse causal relationships should be controlled for, as they could
offer alternative explanations for associations between particular variables. A further point made by the authors is that, due to the lack of longitudinal studies in the reviews on the DCS model, it could be concluded that there is little empirical evidence to support causal interpretation of the associations among job demands, control, support, and health.

One reason that longitudinal studies might fail to find significant results between DCS variables and employee outcomes, could be that effects may take place within a few months rather than periods of a year or more (DeJonge, et al., 2001). A further possibility is that employees have the ability to anticipate the future and the reoccurrence of stressful situations, and they can act to prevent this provided the opportunity arises (Fay & Sonnentag, 2003). If this is the case, conditions will vary at each time point in the study and relationships may not hold over time.

Considering that stronger conclusions can be drawn about causal relationships when using a longitudinal research design, the current study will test the hypothesised relationships longitudinally in the expectation that relationships will remain stable. The longitudinal design will also make it possible to control for reversed and reciprocal relationships, as there is a possibility that they could exist, and the importance of considering reversed effects has been identified by other authors (Taris, 2003; Zapf, et al., 1996). The final hypotheses of the current study are therefore:

**Hypothesis 9:** All of the hypothesised relationships will hold when examining performance over an 18 month time lag.

**Hypothesis 10:** There will be no evidence of a reverse-causal relationship among the data.
Proposed empirical, theoretical and practical contributions of the research

Through examining the hypotheses outlined in this section, the current study aims to make a number of empirical, theoretical and practical contributions to the stressor-performance literature.

Empirical contributions

In empirical terms, the first and perhaps most important contribution of the current investigation is the knowledge this research aims to add to the body of literature examining the relationship between stress-related working conditions and employee performance. The current research is one of the few studies to undertake a comprehensive examination of the relationship between the psychosocial working conditions represented in the DCS and multiple forms of employee performance. Although research has shown there is a strong relationship between psychosocial working conditions and employee health (e.g., Allan, et al., 2009; Barnes & Van Dyne, 2009; Brough, et al., 2009; Hausser, et al., 2010; Lerner, et al., 2010; Van der Doef & Maes, 1999), the effect of stressors on the performance of individual employees has received less attention in job stress research (e.g., Beehr, et al., 2000; Edwards, et al., 2007). The relationship between working conditions and performance is therefore far less clear. The ways in which psychosocial working conditions are related to performance may not parallel the relationship between stressors and health. Despite limited research measuring the effects of stressors on performance (in comparison to well-being as an outcome measure) there is evidence that stressors can conversely affect performance and well-being (Daniels & DeJonge, 2010). Furthermore, of the very small number of studies investigating the relationship between stressors and
performance, none have tested for linear, non-linear and interactive effects in the same study.

A key empirical contribution of the current study will be to provide a comprehensive assessment of the relationship between the conditions represented in the DCS and multiple measures of employee performance. This assessment will include tests for additive and interactive effects, mediation, curvilinearity and reverse-causal effects. These tests will be undertaken to help identify the extent to which working conditions are associated with employee performance and, second, to help clarify how or under what circumstances the work characteristics may influence worker performance. The current investigation also seeks to better understand the pathways through which stress-related working conditions are associated with performance and, to this end, tests will be undertaken to examine the role of attitudinal and health variables in mediating the relationship between stressors and performance. Further, both the working conditions and the potential mediators will be regressed against both in-role and extra-role performance in order to assess the extent to which any work-performance relationships vary according to the type of performance under investigation. Finally, all the aforementioned assessments will be undertaken using cross-sectional and longitudinal data and hence the results will assist in establishing the degree to which the relationships identified are stable over time.

**Theoretical contributions**

From a theoretical perspective, there are strong indications that stress and performance are closely connected, however this topic is under-researched (e.g., Beehr, et al., 2000; Edwards, et al., 2007) and there are gaps in theoretical understanding of the stressor-performance relationship. The current investigation aims to extend stressor-performance theory in terms of additive versus interactive effects, non-linearity,
intervening variables (attitudinal and/or health-related) and differential effects on task and extra-role performance.

The current study is based on the premise that job stress is not necessarily negative, but depends on the meaning that individuals attribute to stressors, in the context of the resources available in the situation (Dewe, 1991). Although it is acknowledged that a certain level of arousal is required to sustain job performance (Warr, 1987; 1990a) high levels of stressors reduce an individual’s capacity to exert control over their work environment, therefore adversely affecting their ability to perform effectively (Bakker, Demerouti, & Verbeke, 2004; McGrath, 1976). However, should an employee face a high level of job demands in the presence of adequate or optimal resources, the stressor (high job demands) may be experienced as a challenge that improves performance. Such conditions are deemed to constitute an “active job”, according to the DCS model (Karasek & Theorell, 1990).

Although these theoretical underpinnings have been identified, more evidence for how stressors impact on multiple forms of employee performance is required (Chatgut & Algom, 2003; Webster, et al., 2010). An important, yet neglected, aspect of the research into the relationship between psychosocial working conditions and performance is the testing of variables that may operate as mediators in the relationship. Although the possibility that variables may intervene in the relationship between stressors and performance has been acknowledged, there is little theory and research on this aspect of the stressor-performance relationship (Cooper et al., 2008; Gilboa et al., 2008). Identifying specific variables that operate as mediators of the relationship between stressors and job performance would improve understanding of how stressors influence performance in the workplace (Cooper et al., 2008; Gilboa et al., 2008). The current study addresses this point
by including attitudinal and psychological well-being indicators that are potential mediators of the relationship between DCS variables and performance.

There is a need for stressor-performance research to include a broader conceptualisation of job performance, considering that the stressor-performance relationship is likely to vary according to the type of performance (e.g., in-role or extra-role) being measured (Fay & Sonnentag, 2002; Webster et al, 2010). Given that stressor-performance research has been largely conducted with in-role behaviour as the only measure of performance (Hoffman, et al., 2007; Motowidlo, et al., 1986), the current study will make a theoretical contribution through investigating whether stressors have differential effects on multiple forms of performance (i.e., IRB, OCB-I, OCB-O and CWB).

A further theoretical contribution of the current study will be to assess potential curvilinear effects in the relationship between psychosocial working conditions and performance. This assessment will provide a more comprehensive understanding of the circumstances in which potentially adverse conditions can undermine or strengthen employee performance. It is important to determine whether the stressor-performance relationship is linear or curvilinear as the majority of stress researchers assume a linear (negative) relationship exists and, therefore, the inverted-U theory has not received adequate testing (Muse, et al., 2003). The current investigation will make a theoretical contribution to stressor-performance research through questioning the assumption that job stress necessarily has a negative, linear relationship to performance. This contribution will be achieved through comprehensively testing both linear and curvilinear relationships between psychosocial working conditions and employee performance.
Practical contributions

Practical contributions of the current investigation will stem from addressing the inconsistent findings of previous research, with regard to the additive and interactive DCS models, mediation and curvilinear effects. Both the additive and interactive models will be tested and compared. If the additive model explains greater variance in the relationship between psychosocial working conditions and performance than the interactive model does, this will suggest that managing performance in the workplace should be based on addressing the individual effects of demand, control and support rather than the interaction effects. The issue of distinguishing between the two DCS perspectives is important as the implications for interventions could differ between the interactive and additive models (Jones & Fletcher, 2003). If, as implied by the interactive model, resources (control and support) are found to have moderating effects on outcomes, it is suggested that job control and support could be increased without consequences for the level of demands (Karasek & Theorell, 1990; Van der Doef & Maes, 1999). On the other hand, if the additive model is supported, increasing the level of control (and/or social support) would not be sufficient to improve outcomes where high demands have a detrimental impact on employees (Karasek & Theorell, 1990; Van der Doef & Maes, 1999).

The findings in terms of possible mediating variables and curvilinear effects will contribute knowledge that can be used to implement appropriate stress management and performance enhancement strategies. Knowledge of whether the association between stressors and attitudinal variables (job satisfaction and affective commitment) is more dominant than the psychological well-being pathway (psychological well-being and psychological distress) may facilitate the development of performance improvement programs. For example, if psychological well-being variables (psychological well-being and psychological distress) were related to performance, stress prevention strategies could
be used to enhance the productivity of employees. Alternatively, job satisfaction and commitment levels would need to be addressed if attitudinal variables were associated with performance. Given that attitudinal and psychological well-being variables are associated with both stressors and performance, the current study aims to contribute to a better understanding of the pathways through which stressors influence performance.

In regard to curvilinear results, a relationship between a stressor and a performance variable that is found to have an inverted-U shaped curve, supporting Warr’s (1987) Vitamin theory of stress, would demonstrate that low levels of a stressor are just as detrimental as high levels. In this instance, employees reporting both low and high levels of demands would need to be identified for receipt of individually targeted stress management interventions. Alternatively, if only linear relationships are found, the implications would be that a population approach should be utilised in interventions to improve the psychosocial working conditions that contribute to enhanced performance. A population-based intervention approach targets the entire working population and aims to control the determinants of psychological strain in an effort to lower the mean level of risk factors and move the whole population in a more favourable direction (Bartholomew, Parcel, & Kok, 1998; Rose, 1992).

These practical contributions are important in terms of managing the stress experienced by public sector employees. The relationship between stressful working conditions and employee performance is particularly relevant to public sector organisations. An issue that has been largely ignored in both the public sector and the broader job stress literature is the relationship between prominent psychosocial working conditions (including those described by the DCS) and employee performance in state-funded organisations. Ultimately, managerialist public sector reform programs are concerned with enhancing the effectiveness of state-funded agencies and their members
Employee performance is central to this effectiveness, most notably in the human services where the quality and quantity of agency output rests heavily on the energy and drive of their members (e.g., education, health care, law enforcement). Research that helps to identify those working conditions that are closely linked to employee performance can make significant contributions towards building more effective civil services. Results from the current investigation could therefore contribute to the development of preventative measures that address potentially stressful organisational characteristics in the public sector context. Conclusions based on the findings of this study could also be transferred to other public sector organisations that operate under high levels of workload coupled with insufficient resources such as control and social support.

Finally, a key contribution of the study that extends current research will be the outcome of the investigation into whether the stressors-performance relationship exhibits differential effects for in-role and extra-role performance. OCB has been shown to contribute to around 25 per cent of organisational effectiveness, although this is not widely recognised (Podsakoff, et al., 2000). Though the contribution of OCB to employee performance is under-researched, OCB is important to the effective functioning of an organisation, in addition to IRB.

If, as hypothesised in the current investigation, there are differential effects for IRB and OCB, with OCB explaining more of the variance in the stressor-performance relationship, there will be a contribution in relation to the management of working conditions. Should OCB account for more of the variance, it will support the argument that employees are able to control their levels of discretionary behaviour, and vary the amounts of OCB they perform when under pressure (Bakker, Demerouti, & Verbeke 2004; Turnipseed & Murkison 2000). This would suggest that employees have more capacity to adjust the level of their discretionary contributions, when resources are stretched, in
comparison to their prescribed tasks. Therefore, the implications for management will be that OCBs, which are an important aspect of employee performance, are related to stressors and need to be considered in interventions that aim to address psychosocial working conditions, with the purpose of improving performance.
CHAPTER 3: Method

The current research aimed to comprehensively examine the relationship between psychosocial working conditions represented in the DCS and employee performance. The research addresses the shortcomings of previous research, based on the premise that a greater understanding of the stressor-performance relationship could help improve efforts to reduce the detrimental effects of stressors and/or recognise and promote the psychosocial working conditions positively associated with performance. As outlined in the literature review, the shortcomings of previous research include a lack of knowledge regarding potential curvilinearity between working conditions and performance measures; inconsistent findings involving the additive and interactive effects of working conditions; a focus on in-role performance measures that generally overlook the differential effects that stressors may have on in-role and extra-role performance; the general absence of mediating variables that can help explain the health and attitudinal pathways through which job stressors influence multiple measures of performance; a heavy reliance on cross-sectional studies that overlook the longitudinal relationships between the study variables; and, finally, an assumption that heightened work demands undermine performance.

In order to achieve the objective of gaining a greater understanding of the stressor-performance relationship, three studies were designed to investigate the hypotheses outlined in the previous chapter. The background to the overall investigation as well as the research procedure, participants and measures used in each of the three studies are described in the following sections.
Background to the investigation

The current investigation was undertaken in conjunction with a large state-funded Australian law enforcement agency. The organisation is one of the largest public sector agencies in the state in which it is based. In common with many other Australian civil services, the organisation instigated NPM-style reforms in the beginning of the 1990s. For several years prior to the current investigation, the organisation had applied an array of changes intended to increase service outputs, improve efficiencies, and strengthen accountability to senior management, government and the wider community. The reforms introduced throughout the organisation included organisational restructuring, the implementation of a performance management system, increased importance placed on the achievement of key strategic targets and stricter cost control measures (Coyle-Shapiro & Kessler, 2003; Noblet & Rodwell, 2009).

Procedure

A two-wave full panel design was used to investigate the study aims and hypotheses generated in this thesis. A timeframe of 18-months was selected, based on requirements of the research design and organisational constraints. The 18-month timeframe met the recommendation that time lags of longer than a year are necessary in order to detect causal effects that may exist (Zapf, et al., 1996), especially in relation to the effects of psychosocial working conditions on employee outcomes (De Lange, et al., 2004). Ethics approval was granted by Deakin University Human Research Ethics Committee, Deakin University, Australia, following submission of an application containing details regarding the research procedures. These research procedures included solicitation of personal information regarded as private, the obtaining of informed consent of research participants, and safeguards put in place to protect the identity of all participants.
Data was collected using a self-report questionnaire administered at T1 and 18 months later at T2. The paper-based questionnaires were sent to employees’ work addresses via the organisation’s internal mail system, accompanied by a covering letter from the Chief Commissioner of the agency. Reminders were sent to employees five and 10 days after the questionnaires were mailed. Participants were invited to complete the survey in their own time and requested to supply their employee number to enable tracking of responses over the duration of the data collection period, however this was completely voluntary. The tracking of responses via employee number was required in order to undertake the longitudinal study (Study 3). Individual participants could not be identified as employee names were not requested and only aggregated data were analysed.

Participants

Participants taking part in the current investigation were public servants employed by the law enforcement agency. The participants were based in a range of departments within the organisation (including human resources training and development, education, business management, information technology, operations co-ordinations, corporate strategy, legal, media and communications, intelligence and forensic services). According to the organisation’s Human Resources Department, there was little variation in the extent to which the aforementioned reforms were implemented across the various departments. The heterogeneity regarding the mix of occupations is important, as interactions are more likely to be found in a heterogeneous sample, on condition that there is an absence of differences in working conditions. A diverse range of occupations, such as the range in the current sample, helps to ensure there are fluctuations in how participants respond to their working environment (i.e., conditions) and therefore provides the required heterogeneity in the data. Situational specificity (i.e., “applicable only to a limited number of similar
professions”) is not an issue in regard to job stress models, provided there is heterogeneity of the sample as a whole (van Veldhoven, Taris, de Jonge, & Broersen, 2005, p. 4). A summary of the demographic characteristics is presented below.

**Time 1 Sample.** A total of 662 (N = 1777) employees returned completed questionnaires in T1, representing a response rate of approximately 36 per cent. The sample of useable responses was reduced to 647 after removing responses with missing data and outliers (see Data screening and assumption-checking). The return rate was consistent with that achieved amongst similar occupation-based studies (Baruch, 1999). Demographics of the sample show that the majority of employees were equally divided amongst three age groups aged 29 years or less (26 per cent), 30-39 years (26 per cent) and 40-49 years (26 per cent). Employees aged 50+ years accounted for the remaining 22 per cent of the sample. Most of the participants were female (61 per cent), most reported tertiary level education (62 per cent) and 31 per cent of respondents had been employed in the organisation for 10 years or more.

**Time 2 Sample.** A total of 595 (N = 1836) participants completed and returned the surveys in Time 2, representing a response rate of 32.4 per cent. The sample of useable responses was reduced to 581 after removing responses with missing data and outliers (see Data screening and assumption-checking). The demographic data showed that the employees were similarly divided amongst four groups aged 29 years or less (29 per cent), 30-39 years (23 per cent), 40-49 years (24 per cent) and 50+ years (25 per cent), most were female (62 per cent), most reported tertiary level education (61 per cent) and 30 per cent of respondents had been employed in the organisation for 10 years or more.

**Matched Sample.** The matched sample included 168 cases of employees who had completed the questionnaires on both occasions and had also provided their employee numbers strictly for the purpose of matching. The sample of useable responses was
reduced to 152 after removing responses with missing data and outliers (see Data screening and assumption-checking). The demographics characteristics of the matched sample were relatively similar to the T1 and T2 data, except for a greater range of age and tenure. A higher number of the employees who provided their employee numbers also reported longer tenure. Employees ranged in age from 29 years or less (16 per cent), 30-39 years (22 per cent), 40-49 years (28 per cent), 50+ years (33 per cent), most were female (55 per cent), most reported tertiary level education (64 per cent) and 41 per cent of respondents had been employed in the organisation for over 10 years or more.

**Data screening and assumption-checking**

Prior to running the analyses, the data was screened and checked for violations of statistical assumptions according to the procedures recommended by Tabachnick and Fidell (2007). Missing values were detected and determined to occur randomly throughout the dataset, not accounting for more than five per cent of any variable, therefore they were treated with list-wise deletion (Tabachnick & Fidell, 2007). Outliers were identified in both the T1, T2 and matched data sets. Any outliers that had standardised residual values above ± 3.3 were deleted from the data set, leaving an effective sample of 647 (T1), 581 (T2) and 152 (matched T1-T2) respectively. The sample sizes were deemed to be appropriate, according to the formula for calculating sample size of \( n > 50 + 8m \) (where \( m \) = number of independent variables) (Tabachnick & Fidell, 2007). Tests were conducted to determine skewness and kurtosis, and frequency histograms and scatterplots were applied to assess whether all variables met the assumptions of normality, linearity and homoscedasticity. Normality was violated in some cases, therefore the impact of extreme univariate outliers (25 cases in total) was reduced by assigning a raw score to the specific case that was either one unit larger or smaller than the next most extreme score in the
distribution (following Tabachnick & Fidell, 2007). After reducing the impact of outliers as described, the data and variables met the requirements for normality, linearity and homoscedasticity.

**Measures**

A number of well-validated scales and questions relating to general demographic information were included in a paper-based questionnaire that was developed for use in the current investigation. The full measures, which were used for both time periods, can be found in Appendix A.

**Job demands.** The quantitative workload scale developed by Caplan, Cobb, French, Harrison and Pinneau (1980) was used to measure job demands, also referred to as workload. The scale assesses both physical and psychological workload and consists of 11 items measuring the amount of work performed by the employee and the pace at which it is performed. Respondents were required to rate how often each aspect of work appears, or applies to their job. Responses were recorded on a five-point scale ranging from ‘rarely’ (5) to ‘very often’ (1), or ‘hardly any’ (5) to ‘a great deal’ (1). Higher scores indicated higher workload demands. Six of the items were reverse-scored so that all of the individual item scores were placed on the same scale with regard to direction. Sample items include: ‘How often does your job require you to work very fast?’ and ‘How many lulls between heavy work load periods do you have?’

**Job control.** Job control was measured using a nine-item scale developed by Karasek (1985). The scale measures the degree to which individuals are able to make work-related decisions and acquire new skills. Responses were recorded on a five-point scale ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5) whereby higher scores
indicated greater job control. Sample items include: ‘My job requires me to be creative’ and ‘I have a lot of say about what happens on my job’.

**Social support.** Social support from within the organisation and from non-work sources was assessed using scales developed by Etzion (1984). The measure contains nine items, seven of which require two answers, the first relating to the employee’s work environment and the second to their life outside of work. These two responses form the two subscales: work support and non-work support. Responses were recorded on a seven-point scale ranging from ‘very little’ (1) to ‘very much’ (7), with higher scores indicating that the sources supported them to a greater extent. Sample items include: ‘To what extent do you get appreciation and recognition for what you do?’ and ‘To what extent is support and advice available to you when you are experiencing difficulties?’

**Job satisfaction.** Job satisfaction was measured with a shortened version of the satisfaction scale from the Job Diagnostic Survey designed by Hackman and Oldham (1976). Respondents were required to rate three items on a seven point scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7). These three items were summed to constitute an overall job satisfaction score, with higher scores associated with higher levels of job satisfaction. Sample items include: ‘Generally speaking, I am very satisfied with this job’ and ‘I am generally satisfied with the kind of work I do in this job.’

**Affective organisational commitment.** The construct of commitment to the organisation was measured using the Affective Commitment Scale (ACS) developed by Allen and Meyer (1990) containing eight items. Respondents were asked to rate each item on a five-point scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5), according to their degree of commitment to the organisation. After reverse-scoring negatively worded items, the eight items were summed to form an overall affective commitment score, with higher scores indicating higher levels of commitment. Sample
items include: ‘I enjoy discussing my organisation with people outside of it’ and ‘I think I could easily become as attached to another organisation as I am to this one.’

Psychological distress. The K10 (Kessler et al., 2002) consists of a 10 question screening scale that measures non-specific psychological distress. The questions in the K10 focus on anxiety and depression, discriminating DSM-IV cases from non-cases. The survey requires respondents to identify how often they have experienced each symptom over a 30-day recall period. Each item is scored on a five-point scale ranging from ‘all of the time’ (1) to ‘none of the time’ (5). Sample items include: ‘In the last 30 days how often: Did you feel depressed?’ and ‘Did you feel so restless that you could not sit still?’

Psychological well-being. The GHQ-12 (Goldberg & Williams, 1988) consists of 12 items in total measuring self-perceived psychological well-being, also referred to as psychological health. More specifically, six of these items measure normal functioning (i.e., being able to concentrate) and the remaining items measure abnormal functioning (i.e., losing self-confidence). Each item is scored on a four-point scale ranging from ‘not at all’ (0) to ‘much more than usual’ (3). Higher scores on the measure are indicative of higher levels of self-rated psychological well-being. Sample items include: ‘Have you recently been able to concentrate on whatever you’re doing?’ and ‘Have you recently been feeling reasonably happy, all things considered?’

Job performance. Employee’s assessments of their job performance were measured using a 21-item scale developed by Williams and Anderson (1991). Both in-role and extra-role behaviours were measured via three subscales: in-role behaviour (IRB); organisational citizenship behaviour aimed at the organisation (OCB-O); and organisational citizenship behaviour directed toward individuals (OCB-I). Each subscale contained seven items which were measured on a seven point scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7). Negatively-oriented items were reverse-scored. An
initial factor analysis of the three-factor scale produced a fourth factor containing negatively-oriented behaviours, termed counter-productive work behaviour (CWB) (see Study 1 Factor Analysis for further details). Higher scores for each of the subscales indicated higher levels of either mandatory (IRB) or discretionary (OCB-I, OCB-O & CWB) behaviours. Sample items include: ‘I help others who have been absent’ and ‘I perform the tasks expected of me’.

**Demographic characteristics.** A range of demographic questions was included in the questionnaire. The information collected included data on age, gender, level of education, type and level of employment and length of tenure. For the purpose of the analyses, control variables were limited to gender (males versus females), age (29 years or less, 30-39 years, 40-49 years, 50 years or more) and tenure (less than nine years, 10 years or more). Prior to their inclusion in the regression analyses the categorical control variables were dummy coded (0,1).

### Statistical analyses

The current investigation employed factor analysis, hierarchical regression, and a procedure for testing multiple mediators to test the study hypotheses. In this section, the rationale for using these particular tests is explained. The approach taken in conducting the analyses is also outlined.

### Factor analysis

The current investigation examined the factor structure of the multidimensional performance measure developed by Williams and Anderson (1991) prior to including the measure in the hierarchical regression analyses. Williams and Anderson (1991) proposed that Organ’s (1988) taxonomy of OCB should be reduced from five dimensions to two (altruism and compliance), encompassing OCB-O and OCB-I, as distinct from IRB. To
this end, they demonstrated that in-role performance could be distinguished from the two forms of contextual performance, OCB-O and OCB-I, thereby producing a three-factor measure of performance.

The Williams and Anderson (1991) measure has since been utilised by researchers seeking to differentiate in-role from extra-role behaviour (Mayhew, et al., 2007; Vigoda-Gadot, 2007) and measure OCB directed at either individuals or the organisation (Tan & Tan, 2008; Vigoda-Gadot, 2007) however distinctions between the OCB-O, OCB-I and IRB dimensions in these studies have not been definitive. Although the majority of findings resulting from the studies that have used the Williams and Anderson (1991) measure confirmed the distinction between OCB and IRB (e.g., Hoffman, et al., 2007; Mayhew, et al., 2007; Vigoda-Gadot, 2007; Williams & Anderson, 1991), task performance was not included in two of the studies (Choi, 2008; Tan & Tan, 2008). It should also be noted that in-role behaviour was measured using only positively-worded items from the Williams and Anderson (1991) measure, and OCB was surveyed with a different instrument (Van Dyne & LePine, 1998), in the research undertaken by Mayhew et al., (2007).Whereas OCB-O and OCB-I were most often found to be separate dimensions (Choi, 2008; Tan & Tan, 2008; Williams & Anderson, 1991) there is evidence to suggest that insufficient empirical difference exists between OCB-O and OCB-I (Hoffman et al., 2007; Vigoda-Gadot, 2007).

Vigoda-Gadot (2007) undertook a factor analysis of the performance measure and found a separate, non-hypothesised factor deemed compulsory citizenship behaviour (CCB). Although this study separated OCB into altruistic and compliance factors in accordance with Williams and Anderson’s (1991) OCB-O and OCB-I dimensions, a three-factor model comprising OCB-O, IRB and CCB proved to be the model with the most distinct factors. CCB was positively related to job stress, intentions to leave and negligent
behaviour, and negatively related to job satisfaction, OCB and task performance. In the factor analysis conducted by Hoffman et al., (2007) to investigate the dimensionality of OCB using the Williams and Anderson (1991) measure, little empirical differentiation was found between the two factors of OCB-I and OCB-O. It was concluded that the best representation of the relationship among the OCB dimensions was a single-factor model of OCB, strongly related, yet distinct from task performance.

Given the lack of consensus on the factor structure of the Williams and Anderson (1991) measure, including the appearance of a non-hypothesised factor in one instance (CCB, Vigoda-Gadot, 2007), the theoretical justification for the scale was called into question. Factor analysis was therefore necessary to determine the structure of the measure before proceeding with further analyses. In order for factor analysis to be considered, it is recommended that the sample contains at least 300 cases and that there are inter-correlations greater than .3 among the items (Tabachnick & Fidell, 2007). Bartlett’s test of Sphericity needs to be significant \( (p < .05) \) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy should be above .6 for a sound factor analysis to be achieved (Tabachnick & Fidell, 2007). The data set used in the current investigation met these criteria for conducting a factor analysis.

When undertaking factor analysis, there are two techniques to choose from; exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Each of these approaches provides the researcher with different information; therefore the decision about which technique to use should be based on what information is required. For example, EFA will provide the actual magnitudes of the cross loadings, whereas CFA will not detect the magnitudes (Hurley et al., 1997). CFA will also not show how appropriately items load on non-hypothesised factors, whereas EFA does show factor loadings and emphasises eigenvalues as indicators of dimensionality (Kelloway, 1995).
A further consideration in conducting factor analysis is the method of extraction to use. EFA encompasses a variety of factor extraction methods, of which the most frequently used is Principal Components Analysis (PCA) (Thompson, 2004). The aim of PCA is to extract maximum variance from the data with each component (Tabachnick & Fidell, 2007). PCA is very useful in exploratory factor analysis as it reveals much information about the maximum number and nature of factors (Tabachnick & Fidell, 2007). In addition to factor extraction, factor rotation is always possible in exploratory factor analysis (EFA) whenever more than one factor is present (Thompson, 2004). Rotation is mostly necessary in these cases to obtain simple structure. If simple structure cannot be achieved with orthogonal rotation, revealed through numerous variables having structure coefficients that are sizeable on two or more factors, oblique rotation may be required to derive interpretable factors (Thompson, 2004).

In order to effectively analyse the factor structure of the Williams and Anderson (1991) measure of performance, the method of analysis chosen was EFA using the PCA method of extraction. This analysis is outlined in Study 1 in the following chapter.

**Hierarchical regression analysis**

The majority of DCS research has used a hierarchical regression approach to analyse data, as evidenced in meta-analytic reviews of DCS studies (see Hausser et al., 2010; Van der Doef & Maes, 1999). As a statistical analysis technique that has become a standard approach for investigations of job stress employing the DCS model (i.e., Hausser et al., 2010; Van der Doef & Maes, 1999) regression analyses allow for multiple predictors to be entered hierarchically, and for models of reverse causation to be tested separately (Zapf, et al., 1996). As the current investigation is designed to test multiple predictors, interactions and multiplicative terms included in the DCS model, as well as reverse-
causation, hierarchical regression is an appropriate statistical analysis technique to use for testing the relationships between study variables.

**Moderation and mediation tests using regression analysis**

Hierarchical regression analysis can also be used to test more complicated research designs including moderation and mediation. Moderation and mediation hypotheses were tested in the current research by following the procedures outlined by Baron and Kenny (1986) and subsequently Preacher and Hayes (2008). The most commonly applied approach to test interactions between continuous variables is hierarchical regression including multiplicative terms in the equations, which controls for main effects (Cohen, Cohen, West, & Aiken, 2003). Using this approach, variables are mean-centered before their interaction (i.e., multiplication) term is computed. The process of mean-centering enhances the interpretability of significant interaction effects (Aiken & West, 1991).

When a model comprises several potential mediating variables, it is possible that each of the intervening variables has an effect on the relationship between the dependent variable (X) and the independent variable (Y) (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The assessment of several mediators in the one model can present complications unless a procedure to examine multiple mediators is used (Preacher & Hayes, 2008). It has been argued that the widely-accepted approaches for testing mediation involving causal steps strategy, the product of coefficients, and the Sobel test (Baron & Kenny, 1986; Sobel, 1982) may not provide the complete array of essential conditions for the strong influence of a causal effect of the independent variable on the dependent variable through an intervening (mediator) variable (MacKinnon et al., 2002). Therefore, an extended causal approach is necessary in order to satisfactorily investigate the effect of multiple mediators (Preacher & Hayes, 2008).
The procedure recommended by Preacher and Hayes (2008) is to apply the product of coefficients approach in a causal steps strategy extended to multiple mediators. First, a linear regression is conducted selecting the dependent variable X and the independent variable Y. If the unstandardized B value associated with X is significantly different to zero it is confirmed that X is related to Y. A second analysis is then conducted with the independent variable now becomes the outcome variable from the first regression analysis, X, and the dependent variable is the first intervening (mediator) variable (M1). The other mediators are also included as independent variables. If the unstandardized B value associated with X is significantly different to zero, then it is confirmed that X is related to M1, after controlling for the other mediators. This process is then repeated to examine each of the other mediators (M2, M3, and M4) sequentially. For the third analysis, the dependent variable is Y and the independent variables are M1, M2, M3, M4 and X respectively. In this analysis, the unstandardized B value associated with M1 represents the extent to which M1 is related to Y after controlling X, M2, M3 and M4. The unstandardized B values of each of the other mediating variables (M2, M3 and M4) can then be interpreted in the same manner. Finally, if the unstandardized B value associated with X in the same analysis is no longer significant (i.e., the extent to which X is related to Y after controlling M1, M2, M3 and M4), then M1, M2, M3 and M4 must fully mediate the relationship between X and Y.

**Replication analyses**

Replicating a study is a strong method of increasing external statistical validation and can strengthen reliability and verify repeatability (Schwab, 2004). This can be particularly important in organisational research, as it is based on human behaviour, which is highly changeable. As a consequence of the exceedingly variable conditions in the workplace and business environment, research in the field of organisational behaviour
generally involves studies with small effects sizes, and is often unable to be repeated (Morrison, Matuszek, & Self, 2010). A significant reason to conduct a replication study is to confirm findings from a previous study, especially when the results are unexpected or unusual (Morrison et al., 2010).

Replication studies can be categorised into four types: strict, partial, operational, and conceptual (Darley, 2000). The type of replication used in the current study is a strict replication, which aims to duplicate the first cross-sectional study (T1) as thoroughly as possible. A strict replication closely follows as many aspects of the first study as possible, in terms of population, sampling procedure, measurement techniques, analysis and methods (Darley, 2000). With respect to the current investigation, the population, sampling procedure, measurement techniques analysis and methods were identical in the strict replication (T2) of the first study (T1). The only variation between the two studies was a difference in the number of participants (n = 647 T1, n = 581 T2). When interpreting the results, the discussion section needs to juxtapose the results of the replication study with the results of the original study. The two studies need to be considered together irrespective of whether contradictory results arise (Morrison, et al., 2010).
CHAPTER 4: Results

This chapter presents the results of the research in study order. The aim of Study 1 was to focus on the dimensionality of the employee performance construct and specific components of the measure in preparation for its inclusion in the cross-sectional and longitudinal regression analyses. An exploratory factor analysis was conducted to examine the factor structure of the job performance measure and check that in-role (IRB) and extra-role (OCB) behaviours were separate dimensions of performance, and that OCB directed toward individuals (OCB-I) was distinct from OCB directed toward the organisation (OCB-O) (Andersen & Williams, 1988). Study 2 was based on a cross-sectional study design and aimed to investigate the strength and nature of the relationship between psychosocial working conditions represented by the DCS, and employee performance, using hierarchical regression analyses. Study 3 (Part 1) was based on a longitudinal research design with a time lag of 18 months between T1 and T2 and sought to establish whether the results of the cross-sectional study were stable over time. Reverse causal analyses were also conducted on the data in line with the aim of establishing whether reciprocal relationships existed between psychosocial working conditions and performance types. A second cross-sectional study, Study 3 (Part 2) was undertaken using T2 data in order to compare the pattern of results at two different time points (T1 and T2).

Study 1

Factor Analysis

The primary objective of this study was to explore the factor structure of the model of performance proposed by Williams and Anderson (1991). The multi-dimensional model of employee performance proposes that that IRB and OCB are separate
dimensions of performance, and that OCB-I is distinct from OCB-O (Williams & Anderson, 1991). SPSS 17.0 for Windows (SPSS Inc., 2009) was used to conduct an exploratory factor analysis (EFA) on the performance items. A three-factor model with oblique rotation was employed to examine the factor pattern of IRB, OCB-I and OCB-O.

The EFA results revealed three factors with eigenvalues of 6.72, 2.15 and 1.81 and accounted for 31.99 per cent, 10.22 per cent and 8.60 per cent of the variance in the self-report data respectively. The pattern of factor loadings for these data indicated that the highest loadings did not occur on the appropriate factor for all items. Items originally proposed to represent the OCB-I scale consistently loaded on Factor 1. However, items 8, 9, 13 and 14 loaded highest on the IRB factor rather than the OCB-O factor where they were proposed to belong according to Williams and Anderson (1991). Most of the items relegated to the IRB factor (Williams & Anderson 1991) loaded on the correct factor, with the exception of items 20 and 21, which achieved their highest loadings on the OCB-O factor. Item 19 attained inadequate loadings (below .2) on each of the three factors. Surprisingly, all negatively-oriented items loaded strongly on to one factor (OCB-O) rather than two factors (OCB-O and IRB). The 21 items used to form the IRB, OCB-I, and OCB-O scales (Williams & Anderson 1991) had reliabilities of .43, .84 and .29 respectively. The inter-correlations among these variables were $r = .31, p < .01$, $r = .33, p < .01$ and $r = .19, p < .01$ respectively. Given the unexpected loadings of the three-factor model, it appeared that an additional fourth factor was evident and therefore additional analyses were undertaken. A four-factor model with oblique rotation was employed to further examine the factor pattern of IRB, OCB-I and OCB-O. Principal components results are shown in Table 2.
Table 2  
Factor loadings of the four factor exploratory factor analysis of performance items (n = 647)  

<table>
<thead>
<tr>
<th>Scale Items</th>
<th>OCB-I</th>
<th>OCB-O</th>
<th>IRB</th>
<th>CWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I help others who have been absent</td>
<td>.84</td>
<td>-.09</td>
<td>-.07</td>
<td>-.05</td>
</tr>
<tr>
<td>2. I help others who have heavy workloads</td>
<td>.85</td>
<td>-.13</td>
<td>-.05</td>
<td>-.04</td>
</tr>
<tr>
<td>3. I assist my supervisor with his/her work (when not asked)</td>
<td>.63</td>
<td>.06</td>
<td>-.10</td>
<td>- .03</td>
</tr>
<tr>
<td>4. I take time to listen to co-workers’ problems and worries</td>
<td>.65</td>
<td>.03</td>
<td>.14</td>
<td>.03</td>
</tr>
<tr>
<td>5. I go out of my way to help new employees</td>
<td>.76</td>
<td>-.02</td>
<td>.04</td>
<td>-.05</td>
</tr>
<tr>
<td>6. I take a personal interest in other employees</td>
<td>.67</td>
<td>.08</td>
<td>.00</td>
<td>.07</td>
</tr>
<tr>
<td>7. I pass along information to co-workers</td>
<td>.58</td>
<td>.13</td>
<td>.16</td>
<td>.00</td>
</tr>
<tr>
<td>8. My attendance at work is above the norm</td>
<td>.01</td>
<td>.63</td>
<td>.02</td>
<td>-.08</td>
</tr>
<tr>
<td>9. I give advance notice when unable to come to work</td>
<td>.15</td>
<td>.59</td>
<td>.07</td>
<td>-.13</td>
</tr>
<tr>
<td>10. I take undeserved work breaks*</td>
<td>.02</td>
<td>-.19</td>
<td>.01</td>
<td>.71</td>
</tr>
<tr>
<td>11. A great deal of my time is spent on personal phone/email communications*</td>
<td>-.13</td>
<td>-.10</td>
<td>.10</td>
<td>.68</td>
</tr>
<tr>
<td>12. I complain about insignificant things at work*</td>
<td>.01</td>
<td>-.28</td>
<td>.12</td>
<td>.68</td>
</tr>
<tr>
<td>13. I conserve and protect organisational property</td>
<td>.06</td>
<td>.55</td>
<td>.35</td>
<td>-.04</td>
</tr>
<tr>
<td>14. I adhere to informal rules devised to maintain order</td>
<td>.02</td>
<td>.24</td>
<td>.72</td>
<td>-.03</td>
</tr>
<tr>
<td>15. I adequately complete my assigned duties</td>
<td>.02</td>
<td>.05</td>
<td>.88</td>
<td>-.02</td>
</tr>
<tr>
<td>16. I fulfill the responsibilities specified in my job description</td>
<td>.04</td>
<td>.30</td>
<td>.92</td>
<td>-.01</td>
</tr>
<tr>
<td>17. I perform the tasks expected of me</td>
<td>.04</td>
<td>.00</td>
<td>.89</td>
<td>-.01</td>
</tr>
<tr>
<td>18. I meet the formal performance requirements of the job</td>
<td>.12</td>
<td>.11</td>
<td>.13</td>
<td>.10</td>
</tr>
<tr>
<td>19. I engage in activities that will directly affect my performance evaluation</td>
<td>.12</td>
<td>-</td>
<td>.13</td>
<td>-</td>
</tr>
<tr>
<td>20. I neglect aspects of my job that I am obligated to perform*</td>
<td>-.05</td>
<td>.27</td>
<td>-.31</td>
<td>.62</td>
</tr>
<tr>
<td>21. I fail to perform essential duties*</td>
<td>-.04</td>
<td>.32</td>
<td>-.33</td>
<td>.65</td>
</tr>
</tbody>
</table>

Note. *Indicates negatively-oriented items (10-12 from OCB-O scale; 20-21 from IRB scale). Bold type indicates highest loadings on IRB, OCB-I, OCB-O and CWB scales.

As shown in Table 2, all items loaded on the correct factors, as proposed by Williams and Anderson (1991), with the exception of the negatively oriented items, which loaded together on a separate fourth factor. As also shown in Table 2, the first four factors had eigenvalues of 2.15, 1.31, 6.72 and 1.81 and explained 10.22 per cent, 6.23 per cent, 31.99 per cent and 8.60 per cent respectively. The cumulative explained variance was increased from 49.09 per cent in the three factor model to 57.04 per cent of the variance in the four factor model. Item 10 (‘I take undeserved work breaks’), item 11 (‘A great deal of my time is spent on personal phone/email communications’), item 12 (‘I complain about insignificant things at work’), item 20 (‘I neglect aspects of my job that I am obligated to perform’) and item 21 (‘I fail to perform essential duties’) loaded on the fourth component. After examining
the nature of the items, this construct was labelled ‘counter-productive work behaviour’ (CWB) to reflect the negatively-oriented behaviour that was common across the five items.

The factor correlations obtained with the oblique rotation were .39 (IRB – OCB-I), .27 (IRB – OCB-O), .30 (OCB-I – OCB-O), -.23 (IRB – NEG), -.12 (CWB – OCB-O) and -.18 (CWB – OCB-I). Due to the low loadings of item 19 across all factors, it was excluded from the analysis. The remaining 20 items were used to form the IRB, OCB-I, and OCB-O factors in line with the scales proposed by Williams and Anderson (1991), with the exception of items 10, 11, 12, 20 and 21, which produced the CWB factor.

**A revised, four-factor model**

The results show that the four factor model of the OCB scale explained a greater amount of variance than the model containing three OCB factors and that CWB is markedly distinct from IRB, OCB-I and OCB-O. Correlations among the performance variables show that when a fourth subscale containing counter-productive work behaviour items (CWB) was incorporated in the model, the sub-scale correlated negatively with the other three OCB subscales (see Table 3). CWB was also the only variable that correlated positively with psychological distress, when the descriptive statistics for all the study variables in the current investigation were generated (see Table 4). This pattern of correlations is one that would be expected for a subscale containing counter-productive work behaviours.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCB-I</td>
<td>39.80</td>
<td>5.19</td>
<td>(.82)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCB-O</td>
<td>23.36</td>
<td>3.11</td>
<td></td>
<td>.398**</td>
<td>(.70)</td>
<td></td>
</tr>
<tr>
<td>IRB</td>
<td>25.40</td>
<td>2.49</td>
<td></td>
<td>.388**</td>
<td>.526**</td>
<td>(.92)</td>
</tr>
<tr>
<td>CWB</td>
<td>9.33</td>
<td>3.80</td>
<td>-.252**</td>
<td>-.382**</td>
<td>-.350**</td>
<td>(.73)</td>
</tr>
</tbody>
</table>
Study 2 Results

The results of Study 2 are presented in the following section. This study was based on a cross-sectional study design aimed at investigating the strength and nature of the relationship between psychosocial working conditions, specifically demand, control & support, and employee performance. The study compared the interactive versus additive models of the DCS, and considered curvilinear effects in order to provide a more comprehensive assessment of the way in which working conditions affect both in-role and extra-role performance. A further aim was to gain a greater understanding of the pathways through which stressors influence performance by examining attitudinal and health variables as potential mediators.

Cross-sectional analysis – T1

The cross-sectional design used hierarchical regression to analyse T1 data. As described in Chapter 3, prior to running all the statistical analyses in the current investigation using SPSS (version 17), data screening and assumption testing for multiple regression were undertaken following the procedures outlined by Tabachnick and Fidell (2007). In preparation for the hierarchical regression analyses, an exploratory factor analysis of the items used to measure employee performance was conducted in Study 1. A four-factor model was found to explain a greater proportion of the variance than the proposed three-factor structure, therefore the revised four-factor model of performance is used in all further analyses.

Four-factor model of performance

As revealed through the exploratory factor analysis in Study 1, results showed that a four-factor model of the work performance scale was superior to the model containing
three factors and that CWB is markedly distinct from IRB, OCB-I and OCB-O. The negatively-oriented behaviour common across the items loading on a fourth variable, were categorised as CWB, forming an additional outcome variable to be used in each of the analyses in Study 2 and Study 3 (see Table 2).

Prior to running the cross-sectional hierarchical regression with T1 data, the descriptive statistics and correlations for each of the study variables were analysed, as shown in Table 4. The correlations were conducted to highlight the pattern of relationships between the generic conditions represented in the DCS model (i.e., job demand, job control, work and non-work support) and the four-factor model of performance, including task (IRB) and discretionary (OCB-I, OCB-O & CWB) behaviours. Many of the correlations between the target measures and the predictor variables in Table 4 were significant. The strongest correlations were revealed between job satisfaction and job control \((r = .55, p < .01)\), job satisfaction and work support \((r = .51, p < .01)\), psychological distress and well-being \((r = -.74, p < .01)\), and IRB and OCB-O \((r = .46, p < .01)\). Job control and workload were significantly correlated with all performance subscales, whereas all dimensions of the DCS, including both types of support, were significantly correlated with OCB-I and OCB-O. Of particular interest in the correlation matrix was the direction of the relationships between workload and the four outcomes measures of performance. High workloads were associated with higher levels of in-role and positive extra-role performance. The direction of this relationship is contrary to what is usually identified in job stress research (i.e., high workloads tend to relate to decreased performance, e.g., Muse et al., 2003). In relation to negative extra-role performance, increased workloads were associated with lower levels of counter-productive work behaviour, in contrast to the majority of research suggesting that heavy job demands are
associated with higher levels of counter-productive behavior (e.g., Spector & Fox, 2005). Reliabilities (i.e., Cronbach alpha’s) of all study scales were in the range of .70 to .92.
Table 4
Descriptive statistics, correlations and reliability coefficients among T1 independent and dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job control</td>
<td>31.91</td>
<td>4.62</td>
<td>.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Workload</td>
<td>39.51</td>
<td>7.19</td>
<td>.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Work support</td>
<td>44.04</td>
<td>11.66</td>
<td>.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Non-work support</td>
<td>51.17</td>
<td>11.00</td>
<td>.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Affective commitment</td>
<td>25.54</td>
<td>6.18</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Psychological distress</td>
<td>18.49</td>
<td>6.83</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Well-being</td>
<td>24.15</td>
<td>5.79</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. IRB</td>
<td>30.46</td>
<td>3.13</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. OCB-O</td>
<td>23.38</td>
<td>3.05</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. OCB-I</td>
<td>39.87</td>
<td>4.97</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. CWB</td>
<td>9.27</td>
<td>3.63</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n = 647, * = p < .05, ** = p < .01. Reliabilities are on the diagonal.

Note: IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour.
Hierarchical regression analyses

Hierarchical regression analyses were performed to: 1) test the relative influence of the DCS model variables on the four performance outcomes (IRB, OCB-O, OCB-I and CWB), 2) determine whether the addition of higher-order terms (i.e., nonlinear terms and interactions) could contribute additional explained variance in the prediction of employee performance, and 3) test for the presence of mediating effects of employee health and attitudes on the relationship between employee working conditions and performance.

Blocks of independent variables were entered in the order of (1) demographic control variables (2) the individual components of the DCS, (3) the squared components of the DCS, (4) the DCS two-way interaction terms, (5) the DCS three-way interaction terms, (6) and the mediating variables. All of the variables used in the analyses that are part of an interaction variable were ‘centred’ before the creation of the interaction variables (Aiken & West, 1991).

As the model included four mediators (job satisfaction, affective commitment, psychological distress and well-being), the process for testing multiple mediators was undertaken as described in Chapter 3. Mediating variables were included in the final step of the hierarchical regression analyses. This step was performed to test the extent to which job demands, job control and social support effects on employees’ performance were mediated by job satisfaction, affective commitment, psychological well-being and psychological distress.

Two regression analyses were performed in order to test for the possible mediating influence of employee attitudes and psychological well-being in addition to the direct effect of working conditions on performance. The first regression contained the mediating variables (job satisfaction, affective commitment, well-being and psychological distress) as outcome variables to test the first of the regression equations, holding all other mediators
as constant (see Table 5). The second regression was conducted with the dependent variables (OCB-I, OCB-O, IRB & CWB) as the outcome variables, controlling for the mediating variables in the final step. This regression was able to test the second and third regression equations as recommended by Baron and Kenny (1986) and outlined in Chapter 3 (see Tables 6 and 7).
Table 5
Regression analyses testing job satisfaction, affective commitment, psychological distress and well-being as mediators at T1

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Job satisfaction</th>
<th>Affective commitment</th>
<th>Psychological distress</th>
<th>Well-being</th>
</tr>
</thead>
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<tr>
<td></td>
<td>B</td>
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<td>ΔR²</td>
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<td>.026*</td>
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<tr>
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<td>.414</td>
<td>-.109*</td>
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<tr>
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<td>Age – 40 to 49 years</td>
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<td>.348</td>
<td>-.061</td>
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</tr>
<tr>
<td>Tenure – 9 years or less</td>
<td>.810</td>
<td>.473</td>
<td>-.092</td>
<td>-.186*</td>
</tr>
<tr>
<td>Tenure – 10 years +</td>
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<td>.034</td>
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<td>.392**</td>
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<td>.023</td>
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<tr>
<td>Work support</td>
<td>.097</td>
<td>.014</td>
<td>.272**</td>
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<td>-.056</td>
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<td>.001</td>
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n = 647. * = p < .05, ** = p < .01
Note: 10 years + = 10 years or more, JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour
Table 6
Hierarchical regression of cross-sectional data prior to inclusion of attitudinal and psychological health variables at T1

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>IRB B</th>
<th>SE B</th>
<th>β</th>
<th>ΔR²</th>
<th>OCB-I B</th>
<th>SE B</th>
<th>β</th>
<th>ΔR²</th>
<th>OCB-O B</th>
<th>SE B</th>
<th>β</th>
<th>ΔR²</th>
<th>CWB B</th>
<th>SE B</th>
<th>β</th>
<th>ΔR²</th>
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<td>.026</td>
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<tr>
<td>WL x WS</td>
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</table>

Note: 10 years + = 10 years or more, JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour.

x = .05, * = p< .05, ** = p< .01
<table>
<thead>
<tr>
<th>Table 7</th>
<th>Hierarchical regression of cross-sectional data with attitudinal and psychological health variables included at T1</th>
</tr>
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</tr>
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</tr>
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</tr>
<tr>
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<td>Age – 40 to 49 years</td>
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<td>Well-being</td>
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</table>

Note: 10 years + = 10 years or more; JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour

α p < .05; ** p < .01; *** p < .001
The Sobel (1982) test was then used to determine whether the results in the regression indicating partial mediation, as represented by reduced beta weights, were significant. The Sobel test performs a statistical test to ascertain whether the indirect path from the independent variable to the dependent variable is statistically significantly different from zero (Sobel, 1990). If the Sobel test statistic is significant at the 0.5 level, the null hypothesis is not rejected and it is held that the relationship between independent variable and the outcome (dependent) variable is mediated by the mediating variable/s. In terms of the current study, evidence of mediation would indicate that the working conditions predict performance through employee well-being, either indirectly (full mediation) or both directly and indirectly (partial mediation).

The results of the regression analyses supported Hypotheses 1 and 2 by indicating each DCS variable was significantly associated with performance, and the vast majority of explained variance in the relationship between working conditions and performance was associated with the additive effects of demand, control and support. None of the interaction effects reached significance and neither of the steps in the regression that included interactions were significant, therefore the hypotheses concerned with interactive effects (Hypotheses 5 and 6) were not supported.

The overall equation for IRB was significant ($R^2_{\text{adj}} = 0.085$, $F(25, 612) = 3.370$, $p < 0.001$). Also significant were the overall equations for OCB-O ($R^2_{\text{adj}} = 0.127$, $F(25, 612) = 4.711$, $p < 0.001$) and CWB ($R^2_{\text{adj}} = 0.190$, $F(25, 612) = 6.976$, $p < 0.001$). The overall equation for OCB-I was also significant ($R^2_{\text{adj}} = 0.134$, $F(25, 612) = 4.948$, $p < 0.001$), however, in the final step of the regression, the mediating variables were not significant predictors of OCB-I. By contrast, in the final step for each of the other three outcome variables (OCB-O, IRB & CWB), mediating variables were significant predictors of performance. These results show that Hypothesis 3, predicting that DCS variables will be
significantly associated with IRB and OCB was largely supported. Hypothesis 4, predicting that an additive model will explain more of the variance in OCB than in IRB, was supported.

The importance of the direct, rather than indirect, DCS effects was also reflected in the number of instances where the individual DCS variables predicted the outcomes. Workload, for example, significantly predicted all four outcome measures, being positively associated with OCB-I ($\beta = .206, p < .01$), OCB-O ($\beta = .155, p < .01$), IRB ($\beta = .158, p < .01$) and negatively associated with CWB ($\beta = -.307, p < .01$). Non-work support also predicted all four outcome measures, being positively associated with OCB-I ($\beta = .176, p < .01$), OCB-O ($\beta = .138, p < .05$), IRB ($\beta = .129, p < .05$), and negatively associated with CWB ($\beta = -.100, p < .05$). Job control, however, predicted only two out of the four performance variables. OCB-O was directly predicted by job control ($\beta = .148, p < .05$) whereas IRB was predicted indirectly, through job satisfaction. For IRB, job control was significant in the second last step of the regression (see Table 6) but not the final step (see Table 7), providing evidence of full mediation (Baron & Kenny, 1986). This relationship was explored further and is presented in greater detail below.

Work support, taking into consideration the quadratic term work support squared, predicted all the outcome variables except for IRB. Work support was positively associated with OCB-I ($\beta = .159, p < .05$), whereas there was a non-linear relationship between work support and OCB-O ($\beta = .111, p < .05$) and a negative association with CWB ($\beta = -.118, p < .05$). In terms of curvilinear effects, Hypothesis 7, predicting the relationship between job demands (workload), job control and social support and employee performance would be non-linear, was only partially supported. There was support for curvilinearity in relation to work support squared and two of the outcome variables (OCB-O and CWB). The relationship between work support squared and OCB-O was positive ($\beta = .111, p < .05$).
however CWB was negatively related to work support squared ($\beta = -.118$, $p < .05$. In relation to IRB, one quadratic term was significant, however the block containing quadratic terms did not reach significance for IRB, therefore the result cannot be considered valid.

Tests for mediation also generated a number of significant results, indicating partial support for Hypothesis 8 predicting that attitudinal (job satisfaction, affective commitment) and health variables (psychological distress, psychological well-being) will mediate the relationship between working conditions and performance. Mediation is indicated where the beta weight associated with the independent variable is either reduced or becomes non-significant after the introduction of the mediator. According to the analyses conducted in Tables 6 and 7 above, two independent variables met the requirements for partial mediation.

The significance of the mediation effects were analysed using Sobel tests (1982). In terms of the current study, evidence of mediation would indicate that the working conditions predict performance through employee well-being, either indirectly (full mediation) or both directly and indirectly (partial mediation).

Job satisfaction fully mediated the relationship between job control and IRB. When job control was included in the regression equation, in Step 5, it was significantly associated with IRB. The inclusion of job satisfaction in Step 6 resulted in the reduction of the beta weight associated with job control, and a non-significant $p$-value ($p = .321$). All three mediation requirements were met. The Sobel test confirmed full mediation ($z = 2.680$, $p = 0.007$) (see Table 7).

The relationship between job control and OCB-O was mediated by affective commitment. There was evidence for partial mediation where the association between job control and OCB-O was significant, although after the inclusion of affective commitment as a mediator, the beta weight associated with job control reduced ($\beta = .148$, $p < .05$). A
Sobel test confirmed the effect ($z = 2.499, p = 0.013$). Finally, for OCB-I, although there appeared to be evidence of mediation in the case of work support, the final step of the regression was not significant and therefore mediation was not supported. There was no evidence of mediation in the case of CWB, although CWB was negatively associated with commitment and positively associated with psychological distress. The only mediating variable that was not significantly related (either directly or indirectly) to any of the performance variables was well-being.

**Study 3 (Part 1) Results**

**Longitudinal analysis T1 – T2**

In order to examine whether the relationship between the DCS and performance was stable over time, hierarchical regression analyses were conducted on the longitudinal data. This data set included only matched cases from T1 and T2 and therefore was considerably smaller in size (152 cases) than the cross sectional study from T1 (647 unmatched cases).

Table 8 lists the descriptive statistics and correlations for each of the study variables. Correlations between the target measures (T2) and the DCS predictor variables (T1) in Table 8 were only significant for OCB-I (IRB, OCB-O and CWB were not significantly correlated with the DCS variables). Workload and job control were both significantly positively correlated with OCB-I. Of the attitudinal and health variables, job satisfaction had the strongest association with T2 target variables, significantly correlating with all T2 target variables. Notably, both job satisfaction and affective commitment were negatively correlated with CWB. All of the variables had reliability scores with fair to good Cronbach’s alphas (from .67 to .93).
## Table 8
Descriptive statistics, correlations and reliability coefficients among T1 and T2 independent and dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>CORR</th>
<th>CORR</th>
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<th>CORR</th>
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<tbody>
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<td>33.49</td>
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<tr>
<td>T1 WL</td>
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<td>10.81</td>
<td>0.42**</td>
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<tr>
<td>T1 WS</td>
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<td>10.12</td>
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<td>-2.46**</td>
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<td>T1 NWS</td>
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<td>10.81</td>
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<td>-0.11</td>
<td>0.37**</td>
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<td>T1 JS</td>
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<td>T1 AC</td>
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<td>0.26**</td>
<td>0.48**</td>
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<td>T1 PD</td>
<td>17.84</td>
<td>5.49</td>
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<td>0.09</td>
<td>0.28**</td>
<td>0.25**</td>
<td>0.22**</td>
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<td>T1 WB</td>
<td>24.44</td>
<td>5.26</td>
<td>0.12**</td>
<td>0.18**</td>
<td>0.48**</td>
<td>0.30**</td>
<td>-0.34**</td>
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<tr>
<td>T1 IRB</td>
<td>25.12</td>
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<td>0.10</td>
<td>0.31**</td>
<td>0.19**</td>
<td>0.57**</td>
<td>-0.79</td>
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<tr>
<td>T1 OCB-O</td>
<td>24.06</td>
<td>2.69</td>
<td>0.17**</td>
<td>0.13</td>
<td>0.31**</td>
<td>0.55</td>
<td>0.59</td>
<td>0.48**</td>
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<tr>
<td>T1 OCB-I</td>
<td>40.00</td>
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<td>0.11</td>
<td>0.18**</td>
<td>0.19**</td>
<td>0.19**</td>
<td>0.03</td>
<td>0.09</td>
<td>0.54**</td>
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<tr>
<td>T1 CWB</td>
<td>8.91</td>
<td>3.47</td>
<td>0.24**</td>
<td>0.16</td>
<td>0.29**</td>
<td>0.25**</td>
<td>0.20**</td>
<td>0.17**</td>
<td>0.12</td>
<td>0.12**</td>
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<tr>
<td>T2 IRB</td>
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<td>2.27</td>
<td>0.15**</td>
<td>0.14</td>
<td>0.48**</td>
<td>0.12**</td>
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<td>0.54**</td>
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<tr>
<td>T2 OCB-O</td>
<td>24.12</td>
<td>2.73</td>
<td>0.16**</td>
<td>0.12</td>
<td>0.28**</td>
<td>0.22**</td>
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<td>0.38**</td>
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<tr>
<td>T2 OCB-I</td>
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<td>n</td>
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</tbody>
</table>

Note: JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, JS = Job Satisfaction, AC = Affective Commitment, PD = Psychological Distress, WB = Well-being, IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour

* = p < 0.05, ** = p < 0.01 Reliabilities are on the diagonal
Hierarchical regression analyses

Hierarchical regression analyses were performed in order to evaluate the lagged effects of the model and assess whether there were changes in performance over time. The first step of the regression included the T2 demographic control variables. The T1 outcomes were also controlled for through inclusion in the first step of the regression. The second step included the individual DCS variables from T1. The relative contribution of the DCS variables to performance at T2 was tested via these two steps. Table 9 presents the results of the longitudinal hierarchical regression.
Table 9
Hierarchical regression of longitudinal data at T2

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>T2 IRB</th>
<th></th>
<th></th>
<th></th>
<th>T2 OCB-I</th>
<th></th>
<th></th>
<th></th>
<th>T2 OCB-O</th>
<th></th>
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<th></th>
<th>T2 CWB</th>
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</tr>
</thead>
<tbody>
<tr>
<td>T2 Gender Male</td>
<td>.148</td>
<td>.349</td>
<td>.032</td>
<td>-9.73</td>
<td>.679</td>
<td>-1.106</td>
<td>.000</td>
<td>.393</td>
<td>.000</td>
<td>.515</td>
<td>.584</td>
<td>.062</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 Age – 29 years or less</td>
<td>-.414</td>
<td>.559</td>
<td>-.071</td>
<td>-1.457</td>
<td>1.083</td>
<td>-1.124</td>
<td>-.940</td>
<td>.637</td>
<td>-1.134</td>
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<td>.943</td>
<td>.050</td>
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<tr>
<td>T2 Age – 30 – 39 years</td>
<td>-.970</td>
<td>.499</td>
<td>-.178</td>
<td>-.411</td>
<td>.956</td>
<td>-.038</td>
<td>-.345</td>
<td>.562</td>
<td>-.053</td>
<td>.564</td>
<td>.944</td>
<td>.057</td>
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<tr>
<td>T2 Age – 40 to 49 years</td>
<td>-.527</td>
<td>.427</td>
<td>-.110</td>
<td>-.434</td>
<td>.825</td>
<td>-.045</td>
<td>-.459</td>
<td>.485</td>
<td>-.080</td>
<td>.868</td>
<td>.721</td>
<td>.100</td>
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</tr>
<tr>
<td>T2 Tenure – 9 years or less</td>
<td>.074</td>
<td>.574</td>
<td>.016</td>
<td>-.526</td>
<td>1.113</td>
<td>.055</td>
<td>.114</td>
<td>.647</td>
<td>.020</td>
<td>.196</td>
<td>.982</td>
<td>.023</td>
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</tr>
<tr>
<td>T2 Tenure – 10 years +</td>
<td>-.399</td>
<td>.602</td>
<td>-.077</td>
<td>-.510</td>
<td>1.173</td>
<td>-.049</td>
<td>.034</td>
<td>.683</td>
<td>.005</td>
<td>.559</td>
<td>1.030</td>
<td>.060</td>
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<tr>
<td>T1 Outcome</td>
<td>.523</td>
<td>.076</td>
<td>.502**</td>
<td>.322**</td>
<td>.584</td>
<td>.077</td>
<td>.533**</td>
<td>.345**</td>
<td>.608</td>
<td>.070</td>
<td>.600**</td>
<td>.396**</td>
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<tr>
<td>T1 Job control</td>
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<td>.026</td>
<td>.099</td>
<td>.068</td>
<td>.121</td>
<td>-.003</td>
<td>.040</td>
<td>-.005</td>
<td>-.059</td>
<td>-.059</td>
<td>-.081</td>
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<tr>
<td>T1 Workload</td>
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<td>.021</td>
<td>.020</td>
<td>.050</td>
<td>.031</td>
<td>.005</td>
<td>.029</td>
<td>.014</td>
<td>.010</td>
<td>.043</td>
<td>.017</td>
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<tr>
<td>T1 Work support</td>
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<td>.018</td>
<td>-.016</td>
<td>.019</td>
<td>.036</td>
<td>.045</td>
<td>.016</td>
<td>.021</td>
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<td>.031</td>
<td>.103</td>
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<tr>
<td>T1 Non-work support</td>
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<td>.017</td>
<td>.064</td>
<td>-.004</td>
<td>-.020</td>
<td>-.033</td>
<td>-.045</td>
<td>.026</td>
<td>.010</td>
<td>.019</td>
<td>.037</td>
<td>.005</td>
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</table>

n = 152, * = p < .05, ** = p < .01
Note: 10 years + = 10 years or more, JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour
The results of the regression analyses indicate that, after controlling for the T1 outcome variable, none of the main effects for the DCS variables were significant. Given that none of the predictors in the regression achieved significant results, it should therefore be concluded that, longitudinally, the level of explained variance captured by the working conditions was negligible. Hypothesis 9, which stated that all of the hypothesised relationships will hold when examining long-term performance, was not supported.

Additional analyses were, however, conducted to test potential reverse-causation effects in line with the hypothesis (Hypothesis 10) that there would be no evidence of reverse-causality among the data. As previous research has suggested (de Lange, et al., 2005; Zapf, et al., 1996), reciprocal and reverse causal relationships should be controlled for, due to the possibility they could offer alternative explanations for associations between particular variables. It is possible that DCS variables and performance, or mediating variables and performance, could mutually influence each other (de Lange, et al., 2005; Riketta, 2008). To test these potential reverse-causation effects of the DCS and performance variables, the procedure specified by Zapf et al., (1996) was conducted. After controlling for the effects of confounding variables as well as DCS variables at T1 in the first step, performance variables at T1 were regressed onto DCS variables at T2. No significant results were found, indicating that there was no evidence for reverse causality.

The procedure was again followed to test the potential reverse-causation effects of mediating and performance variables. After controlling for the effect of confounding variables as well as mediating variables at T1 in the first step, performance variables were regressed on to mediating variables at T2. Again, no significant results were found.

Finally, the procedure was followed to test the potential reverse-causation effects of mediating and DCS variables. After controlling for the effect of confounding variables as well as DCS variables at T1 in the first step, mediating variables were regressed on to
DCS variables at T2. In one instance, there was a significant result, indicating some evidence for reverse-causality. Results showed that greater well-being at T1 was associated with greater work support T2 ($\beta = .185, p < .05$). Results are presented in Table 10.

Table 10
Reverse-causal relationship between mediating variables at T1 and work support T2

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>$\Delta R^2$</th>
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<td>.675**</td>
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<tr>
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<tr>
<td>Tenure – 9 years or less T1</td>
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<td>2.530</td>
<td>-.114</td>
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<td>Tenure – 10 years + T1</td>
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<td>.468**</td>
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<td>Step 2</td>
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<tr>
<td>Job satisfaction T1</td>
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<tr>
<td>Affective commitment T1</td>
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<td>.043</td>
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<td>Psychological distress T1</td>
<td>-.052</td>
<td>.178</td>
<td>-.026</td>
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<tr>
<td>Well-being T1</td>
<td>.410</td>
<td>.204</td>
<td>.185*</td>
<td>.035*</td>
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</tbody>
</table>

*p < .05, **p < .01

Note: 10 years + = 10 years or more

Study 3 (Part 2) Results

Cross-sectional analysis – T2

The relationship between working conditions and performance may only be short term and may not hold over a longer period. Accordingly, a second round of cross-sectional analyses was conducted using Time 2 data, replicating the initial model and testing the robustness of the relationships.

Hierarchical regression analyses

Hierarchical regression analyses were performed on the 581 unmatched cases from the T2 data in the same manner as the T1 cross sectional data. Table 11 lists the descriptive
statistics and correlations for each of the study variables. The procedure for examining multiple mediators as described and followed in the first cross-sectional analysis (Study 2) was again undertaken. The results of the series of regression analyses testing mediation are presented in Table 12.

The full hierarchical regression with performance types as the outcome variables and with mediating variables included in the final step of the analysis was then conducted. Blocks of independent variables were entered in the order of (1) demographic control variables (2) the individual components of the DCS, (3) the squared components of the DCS, (4) the DCS two-way interaction terms, (5) the DCS three-way interaction terms, (6) and the mediating variables. Results of the regression analyses are shown in Tables 12-14.
Table 11
Descriptive statistics, correlations and reliability coefficients among T2 independent and dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<td>1. Job control</td>
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<td>2. Workload</td>
<td>40.04</td>
<td>7.28</td>
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<td>3. Work support</td>
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<td>12.14</td>
<td>(.91)</td>
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<tr>
<td>4. Non-work support</td>
<td>51.07</td>
<td>10.75</td>
<td>(.89)</td>
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<td>5. Job satisfaction</td>
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<td>6. Affective commitment</td>
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<td>6.16</td>
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<td>7. Psychological distress</td>
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<td>8. Well-being</td>
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<tr>
<td>9. IRB</td>
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<td>2.46</td>
<td>(.88)</td>
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<tr>
<td>10. OCB-O</td>
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<td>3.05</td>
<td>(.66)</td>
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<tr>
<td>11. OCB-I</td>
<td>40.02</td>
<td>5.00</td>
<td>(.81)</td>
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<tr>
<td>12. CWB</td>
<td>9.62</td>
<td>4.04</td>
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n = 581, * = p< .05, ** = p< .01. Reliabilities are on the diagonal

Note: IRB = In-role Behaviour, OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour
Table 12
Regression analyses testing job satisfaction, affective commitment, psychological distress and well-being as mediators at T2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Independent</th>
<th>Job satisfaction</th>
<th>Affective commitment</th>
<th>Psychological distress</th>
<th>Well-being</th>
<th>( \Delta R^2 )</th>
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<tbody>
<tr>
<td>Gender Male</td>
<td>-459 .241 -0.053 .013 .408 .456 .032 .020 .164 .421 .011 .017 .708 .347 .057 .018</td>
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<tr>
<td>Age – 29 years or less</td>
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<td>Age – 30 – 39 years</td>
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<tr>
<td>Age – 40 to 49 years</td>
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<tr>
<td>Tenure – 9 years or less</td>
<td>-062 .400 -0.007 -2.15 .753 .016 -1.578 .691 .097* -887 .574 .067</td>
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<tr>
<td>Tenure – 10 years +</td>
<td>-464 .439 -0.043 -0.02 .829 .000 -0.840 .764 .044</td>
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<tr>
<td>Job control</td>
<td>.190 .024 .291** .454** -0.005 .049 -0.005 .213** -0.001 .045 -0.001 .227** .006 .037 .007 .202**</td>
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<tr>
<td>Workload</td>
<td>-0.19 .020 -0.034 .090 .037 .106* -0.004 .035 -0.003 -0.093 .028 .111**</td>
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<tr>
<td>Work support</td>
<td>-0.77 .013 -0.225** -0.081 .025 .159** -0.035 .023 -0.057 -0.063 .019 .006</td>
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<tr>
<td>Non-work support</td>
<td>-.042 -.012 -0.169** -0.032 -0.024 -0.056 -0.050 .022 .073* .034 .018 .060</td>
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<tr>
<td>JC x WL</td>
<td>-0.003 .003 -0.043 -0.018** -0.007 .005 .073 .003 .002 .005 .020 .006 .004 .061</td>
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<tr>
<td>WL x WL</td>
<td>-0.005 .002 -0.101** -0.002 .003 .028 -0.007 .003 .083** -0.008 .002 .106**</td>
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<tr>
<td>WS x WS</td>
<td>-0.001 .001 .034 -0.001 .002 .036 -0.002 .002 .059** -0.003 .001 .086*</td>
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<td>NWS x NWS</td>
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<tr>
<td>JC x WS</td>
<td>-006 .003 .079 .012** .015 .006 .147** .020* .007 .006 .057 .006 .005 .005 .048 .001</td>
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<tr>
<td>JC x NWS</td>
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<tr>
<td>WL x WS</td>
<td>-0.001 .002 .023 -0.002 .003 .027 -0.001 .003 .007 -0.001 .002 .012</td>
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</tr>
<tr>
<td>WL x NWS</td>
<td>-0.004 .001 -0.086* -0.001 .003 .014 -0.002 .003 .030 -0.000 .002 .003</td>
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<tr>
<td>WL x NC x NWS</td>
<td>-0.003 .002 -.049 -0.001 -.003 -.011 -0.001 .003 .011 -0.003 .002 .043</td>
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</tr>
<tr>
<td>WL x JC x WS</td>
<td>-000 .000 .041 -0.004 .000 .000 .000 .000 .000 .042 -0.000 .000 .000 .000 .000 .000</td>
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</tr>
<tr>
<td>WL x JC x NWS</td>
<td>-000 .000 .044 -0.001 .000 .045 -0.000 .000 .024 -0.001 .000 .000</td>
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<tr>
<td>Job satisfaction</td>
<td>-.199 -.021 -.295** -.125** -0.725 .074 .490** -0.131** -0.311 .073 -.176** .355** .097 .061 .067 .350**</td>
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</tr>
<tr>
<td>Psychological distress</td>
<td>-.105 -.024 -.186** -0.045 .046 .055 -0.044 .045 .054 -0.544 .027 .663*</td>
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<tr>
<td>Well-being</td>
<td>.044 .029 .069 .005 .056 .094 -0.792 .039 -.649** -0.754 .027</td>
<td></td>
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</tbody>
</table>

Note: 10 years + = 10 years or more; JC = Job Control; WL = Workload; WS = Work Support; NWS = Non-work Support; IRB = In-role Behaviour; OCB-O = Organisational Citizenship Behaviour directed towards the Organisation, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour.
Table 13
Hierarchical regression of cross-sectional data prior to inclusion of attitudinal and psychological health variables at T2

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<tr>
<th>Variable</th>
<th>IRB</th>
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<th></th>
<th></th>
<th>OCB-I</th>
<th></th>
<th></th>
<th></th>
<th>OCB-O</th>
<th></th>
<th></th>
<th>CWB</th>
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<td>B</td>
<td>SE B</td>
<td>β</td>
<td>ΔR²</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>ΔR²</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>ΔR²</td>
<td>B</td>
<td>SE B</td>
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<td>-.039</td>
<td>.255</td>
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<td>.402</td>
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<td>.159</td>
<td>.484</td>
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<td>Age – 30 – 39 years</td>
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n = 581, * = p < .05, ** = p < .01

Note: 10 years + = 10 years or more, JC = Job Control, WL = Workload, WS = Work Support, NWS = Non-work Support, IRB = In-role Behaviour, OCB-I = Organisational Citizenship Behaviour directed towards the Organisation, OCB-O = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour
<table>
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<tr>
<th>Independent Variable</th>
<th>IRB</th>
<th>OCB-I</th>
<th>OCB-O</th>
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<td>.173**</td>
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Note: n = 581, * = p < .05, ** = p < .01

Table 14: Hierarchical regression of cross-sectional data with attitudinal and psychological health variables included at T2

IRB = In-role Behaviour, OCB-I = Organisational Citizenship Behaviour directed towards the Individual, CWB = Counter-productive Work Behaviour
Just as was the case in the T1 analyses, the results of the T2 cross sectional regression analyses (refer Table 14) indicate that the vast majority of the explained variance in the relationship between working conditions and performance was associated with the additive effects of demand, control and support. Although two of the interaction terms reached significance in the fourth step of the regression, none of the $R^2$ values for the step were significant, therefore it can be concluded that interaction effects were not significant predictors of performance at T2.

The overall equation for IRB was significant ($R^2$ adj = 0.056, $F(25, 550) = 2.367, p < 0.05$. The overall equations were also significant for OCB-O ($R^2$ adj = 0.082, $F(25, 550) = 3.063, p < 0.001$, OCB-I ($R^2$ adj = 0.125, $F(25, 550) = 4.272, p < 0.05$ and CWB ($R^2$ adj = 0.173, $F(25, 550) = 5.807, p < 0.001$.

The importance of the direct DCS effects was again reflected in the number of instances where the individual DCS variables predicted the outcomes. Workload and non-work support, for a second time, significantly predicted all four outcome measures. Workload was positively associated with OCB-I ($\beta = .189, p < .01$), OCB-O ($\beta = .157, p < .01$), IRB ($\beta = .173, p < .01$) and negatively associated with CWB ($\beta = -.242, p < .01$). Non-work support was positively associated with OCB-I ($\beta = .127, p < .01$), OCB-O ($\beta = .137, p < .01$), IRB ($\beta = .115, p < .05$), and negatively associated with CWB ($\beta = -.156, p < .01$). Work support predicted only OCB-I ($\beta = .174, p < .01$) and CWB ($\beta = .115, p < .05$).

Job control was not a significant predictor of any of the performance variables at T2 (with the exception of JC² and CWB), although it had significantly predicted two forms of performance (IRB and OCB-O) in T1. Workload, by contrast, predicted all forms of performance at both time-points. Therefore, it would appear that workload is associated with positive forms of performance (because it is also related to lower CWB) independently of control.
There was support for curvilinearity in relation to non-work support squared and three of the performance outcomes. Non-work support squared was positively associated with IRB ($\beta = .127, p < .01$) and OCB-O ($\beta = .093, p < .05$), but negatively associated with CWB ($\beta = -.153, p < .01$). Work support squared was negatively associated with CWB ($\beta = -.106, p < .05$), and workload was positively associated with OCB-O ($\beta = .192, p < .01$). These findings contrast somewhat with the T1 study, which resulted in curvilinear relationships for the alternative form of support (work support squared) and two of the performance variables, namely OCB-O and CWB. In T2, IRB was significantly related to non-work support squared, with the corresponding step of the regression also being significant, whereas the step containing quadratic terms was not significant for IRB at T1.

Tests for mediation were followed according to the process conducted in the T1 cross sectional study. Although there were twelve significant results in the analyses containing mediating variables and performance measures at T2, Sobel tests on the results revealed only one of the relationships was significant. The relationship between work support and OCB-I ($\beta = .174, p < .01$) was partially mediated by commitment ($z = 2.545, p = 0.011$). The solitary mediating relationship at T2 contrasts with the two mediating relationships found at T1. Once more, the only mediating variable that had no significant relationship to any of the performance variables was well-being.
CHAPTER 5: Discussion

The following discussion will focus firstly on explaining the dimensions of discretionary work performance in relation to the findings of the factor analysis conducted in Study 1. Then the findings of Study 2 (the cross-sectional study of T1 data) will be discussed, followed by a brief section outlining the lack of findings generated from the longitudinal data in Study 3 (Part 1). In the final section of the discussion, the results of Study 3 (Part 2), which is a replication of the cross-sectional study at T1 using T2 data, will be compared and discussed.

Study 1 Discussion

Factor Analysis

The aim of Study 1 was to better understand the factor structure and specific components of the organisational citizenship behaviour scale developed by Williams and Anderson (1991). This investigation was undertaken in response to the ongoing debate regarding the dimensionality of organisational citizenship behaviours and the extent to which separate factors can be defined. The study was significant for two reasons. First, contrary to the expected conceptualisation of a three factor solution, the OCB scale appears to have a four-factor structure, comprising in-role behaviour, organisational citizenship behaviour directed towards (1) individuals or (2) the organisation, and a fourth factor consisting of negatively-oriented items. The second reason that the current study is significant is that the items contained in the fourth factor appear to capture a pattern of counter-productive work behaviour, indicating that this factor is a latent variable. This four factor model of OCB that conceptualises counter-productive work behaviour as a distinct subscale was developed as a result of these findings and incorporated in Studies 2 and 3.
The following discussion will focus on explaining the dimensions of discretionary work performance in relation to the findings of Study 1.

*Discretionary work performance*

Much of the research in the area of OCB has focused on its antecedents, including job satisfaction, organisational commitment, organisational justice and perceived organisational fairness (Blakely, Andrews, & Moorman, 2005; Niehoff & Moorman, 1993; Organ & Ryan, 1995; Podsakoff, et al., 2000; Tepper & Taylor, 2003). A number of studies have investigated the dimensionality of OCB and these have resulted in the inclusion of dimensions such as compulsory citizenship behaviour (Vigoda-Gadot, 2007) and counter-productive work behaviour (Kelloway, Loughlin, Barling, & Nault, 2002; Sackett, Berry, Wiemann, & Laczo, 2006). Extra-role behaviour has also been closely examined by researchers investigating contextual performance, with the finding that when and how a person engages in contextual performance is much more discretionary than when and how an employee undertakes task performance (Van Scotter, Motowidlo & Cross, 2000). The current study provides support for the proposition that the context and type of discretionary work behaviour is important. Through conceptualising OCB as a dimension of overall job performance that can be either beneficial or detrimental to the effective functioning of organisations, the current study challenges the widely held view that discretionary performance associated with organisational citizenship is uniformly positive (Podsakoff & MacKenzie, 1994; Podsakoff, et al., 1997; Walz & Niehoff, 2000). The acknowledgement that an undesirable aspect of discretionary work performance exists alongside positive forms of OCB is important in terms of measuring and monitoring behaviours that lessen organisational effectiveness (Robinson & Bennett, 1995).
**OCB as a dimension of job performance**

Job performance is an important contributor to organisational effectiveness that not only refers to the quality and quantity of work undertaken by employees as part of their prescribed roles, but also takes into account extra-role activities (O'Reilly & Chatman, 1986) and citizenship behaviours (Smith, et al., 1983). The job performance research also indicates that employees who work persistently, are helpful to others and use initiative to solve problems are more effective and successful than staff members who do not display these behaviours (Van Scotter, et al., 2000). As a result of the close associations between citizenship behaviours and employee effectiveness, there has been a tendency for OCB and contextual performance research to focus on the positive aspects of OCB and its benefits in terms of how persistence, helpfulness and other citizenship behaviours contribute to enhanced employee performance and improved organisational effectiveness (Podsakoff & MacKenzie, 1994; Podsakoff, et al., 1997; Walz & Niehoff, 2000). However there is also a negative aspect to performance associated with corporate citizenship.

In contrast to focusing only on positive aspects of OCB, the current study considered both positive (i.e., OCB-I, OCB-O) and negative (i.e., CWB dimensions of OCB. Defining performance according to both positive and negative dimensions allows further analysis into the pattern of employee behaviours that reduce organisational efficiency, such as failure to perform essential duties, taking undeserved work breaks, and excessive personal use of communication systems. A further consequence of employees engaging in counter-productive behaviours, such as constant complaining about trivial matters and neglecting to perform necessary obligations, is their potential to influence co-workers in an unconstructive manner that detracts from organisational effectiveness (Robinson & Bennett, 1995). Failure to fulfil essential tasks can be perceived as anti-IRB, or going against the system, and coupled with complaining about the organisation on a
regular basis, this pattern of behaviour has the potential to undermine morale, reduce organisational commitment and negatively influence the culture within the organisation.

The outcome of Study 1 confirms that the domains of work performance do indeed include task performance, positive extra role behaviour and negative discretionary behaviour, however negative behaviour that detracts from organisational performance are also clearly delineated.

**OCB and Counterproductive Work Behaviour (CWB)**

The link between OCB and CWB found in the current study has been documented by other researchers (Kelloway, et al., 2002; Sackett, et al., 2006). Counterproductive behaviour has been defined in the literature as deliberate actions by individuals to breach fundamental organisational policies, rules and procedures, thereby causing harm to the organisation and its members (Robinson & Bennet, 1995). CWB varies in severity, and can involve both acts of commission and omission, such as deliberately not passing on information to co-workers, gossiping about organisational leaders, or committing acts of psychological or physical aggression that detract from organisational effectiveness (Robinson & Bennett, 1995). The behaviours constituting CWB in the current study have also been identified in previous research as "neglect of in-role duties" (Turnley & Feldman, 2000). This neglect of in-role duties relates to the extent to which employees shirk their in-role responsibilities or avoided performing basic duties required by their jobs by wasting time, taking unearned breaks and taking care of personal business (Turnley & Feldman, 2000).

In most research to date, CWB and OCB have been regarded as separate constructs. However, there are adequate reasons to question whether the constructs are empirically distinct due to the degree of item and construct overlap (Kelloway, et al., 2002). For example, item overlap occurs in some measures of OCB and CWB. Robinson and
Bennett’s (1995) counter-productive work behaviour scale includes a production deviance component which is categorised as relatively minor deviant behaviour that is harmful to the organisation. The items included in this dimension reflect sub-role behaviour such as taking excessive work breaks, intentionally working slowly and wasting resources (Robinson & Bennett, 1995). These behaviours overlap substantially with items in the Williams and Anderson (1991) scale, such as ‘I take undeserved work breaks’, ‘A great deal of my time is spent on personal phone and email communications’ and ‘I neglect aspects of my job that I am obligated to perform’ which also denote sub-role performance that goes against organisational norms.

The results of the current study support the general results of previous research that has acknowledged competing viewpoints as to whether OCB and CWB are best viewed as behaviours located on a single continuum or as distinct constructs. That is, self-reported CWB and OCB are negatively correlated and do reflect separate albeit related constructs (Kelloway, et al., 2002; Sackett, et al., 2006). There is a strong case that OCB and CWB are distinct constructs, not just opposite ends of the one spectrum. This proposition implies that it is possible for someone to score high (or low) on both OCB and CWB (Kelloway, et al., 2002; Sackett, et al., 2006). There is a problem when using one scale to measure OCB (or non-task behaviour) and assuming that the negatively-oriented statements reflect low OCB, such as the Williams and Anderson (1991) scale does, as it actually contains unacknowledged aspects of CWB (Spector, Bauer, & Fox, 2010). Utilising the Williams and Anderson (1991) scale used in the current study, Tan and Tan (2008) investigated social loafing and OCB, but did not examine the underlying dimensions of the scale, and also did not measure IRB. The authors recognised that social loafing is one form of counter-productive work behaviour (CWB) in which deliberate actions are taken to harm the organisation or its employees (Spector & Fox, 2002).
When investigating discretionary job performance, it is important to have separate OCB and CWB items and to have a similar number of positively-worded and negatively-worded statements, especially if using self-report measures. Usually, OCB is measured along with CWB to give balance, otherwise impression management is likely to come into play if participants are only asked about negative behaviours (Kelloway, et al., 2002). OCB and CWB are both voluntary behaviours, however OCB is intended to benefit the organisation whereas CWB is intended to be detrimental (Fox & Spector, 2006), therefore it is prudent that managers be aware of both aspects of discretionary work behaviours.

**Implications**

Consistent with the conclusions of previous research linking OCB and CWB, the findings of the current study support the contention that it is appropriate for researchers to continue to conceptualise self-reported CWB and OCB as distinct constructs (Kelloway, et al., 2002; Sackett, et al., 2006). Given the significant contribution of discretionary work behaviour to organisational effectiveness, it is important for organisations to be aware of the negative aspects of OCB and the detrimental impact that these behaviours can have on organisational functioning (Fox & Spector, 2006). Considering that the use of organisational surveys measuring discretionary employee behaviours is extensive, it is imperative that these behaviours are not simply considered as opposite poles of the same continuum, namely role performance in the organisation (Giacolone & Greenberg, 1997). Through incorporating the dimensions of CWB into a performance measurement scale, behaviour that goes against the system, violates organisational norms, and reflects sub-role performance can be identified. Once this data has been gathered, interventions can be implemented based on the types of behaviours the organisation wants to prevent or reduce (Sackett, et al., 2006).
Study 2 Discussion

Cross-sectional analysis – T1

The first cross-sectional analysis of this research aimed to investigate the strength and nature of the relationship between the working conditions represented in the DCS and employee performance. The study compared the synergistic versus additive models of the DCS, and considered curvilinear effects in order to provide a more comprehensive understanding of the way in which stressors affect both in-role and extra-role performance. A further aim was to gain a greater understanding of the pathways through which stressors influence performance by examining health and attitudinal variables as potential mediators. Previous job stress research has focused largely on health and attitudinal variables as outcomes of psychosocial working conditions (Hausser, et al., 2010; Van der Doef & Maes, 1999). Comparatively less is known about the effect of potentially stressful working conditions on employee performance (e.g., Beehr, et al., 2000; Edwards, et al., 2007) and the intervening role that health and attitudinal variables may have in the relationship (Fried, et al., 2008; Gilboa, et al., 2008). To comprehensively investigate this relationship, a series of analyses were undertaken to test for linear, curvilinear and interactive effects and the extent to which these relationships were mediated by employee attitudes and health.

The results of the cross-sectional analyses provide several important findings. When coupled with the results of previous stressor-health research, the findings of the regression analyses (see Tables 6 and 7) undertaken in Study 2 suggest that stressful working conditions not only impact on employee health but they may also adversely affect employees’ ability to perform their work effectively. Although the DCS variables accounted for relatively small proportions of explained variance in the four outcome measures, the vast majority of the explained variance in the relationship between working
conditions and performance was associated with the additive effects of demand, control and support. The interaction components of the model did not reach significance finding no support for Hypotheses 5 and 6. In contrast, some support for Hypothesis 7 was identified where non-linear effects were found in relation to the association between work support and two of the four performance types. Resources, such as job control and support (both work and non-work), were important predictors of employee performance outcomes. Additionally, the evidence of mediation, although not strong, indicates that both stressors and attitudinal variables were contributing to performance outcomes. Although not specified in the hypotheses, a fourth performance type (CWB) was identified in the factor analysis undertaken in Study 1 and subsequently included in the regression analyses for Study 2. A number of significant results were found for CWB, indicating that negative types of job performance can make a valuable contribution to stressor-performance research.

The following discussion will highlight findings that offer further insight into the nature of the relationship between stress-related working conditions and performance, including CWB.

*The value of the DCS model in predicting performance*

Although the DCS variables accounted for relatively small proportions of explained variance in the outcome measures the overall pattern of results evident in the regression analyses indicates that the model is not only applicable to health-related measures, but may also have value in predicting performance outcomes (e.g., Van der Doef & Maes, 1999). Additive and interaction effects were tested to determine whether the DCS variables acted independently or synergistically. There were no significant interaction effects, therefore the interaction hypotheses (Hypotheses 5 & 6), proposing that the
influence of job demands depends on the presence of control and social support (in two-way and three-way interactions), were not supported. Results indicated that, rather than functioning synergistically, components of the DCS are individually associated with performance. This outcome is in line with previous DCS research suggesting that job demands and job control separately predict job-related outcomes (Fletcher & Jones, 1990; Wall, et al., 1996) and that support for interactions between these variables is generally mixed (Brough & Williams, 2007; de Jonge, Dollard, et al., 2000; de Jonge, Reuvers, et al., 2000). Overall, results involving the additive and interaction models suggest that managing performance in the workplace should be based on addressing the individual effects of demand, control and support rather than the interaction effects.

One of the most important findings in the current investigation concerns job demand and its relationship to all four performance measures. Of particular interest was the direction of the relationship between job demands and performance outcomes. In contrast to the majority of job stress research proposing that stressors negatively affect job performance (LePine, et al., 2005; Wallace, et al., 2009), higher levels of desirable performance (i.e., IRB, OCB-O, OCB-I) and lower levels of undesirable performance (i.e., CWB) were associated with higher work demands rather than lower demands. Although this finding is uncommon, there is evidence of a positive association between workload and job performance in previous research, suggesting that workers experiencing the greatest amount of workload complete the most work (Beehr, et al., 2000; Beehr, Walsh, & Taber, 1976). Frequently, the most competent and skilled workers are given more tasks and responsibilities than less proficient colleagues within the organisation (Beehr et al., 2000).

A second explanation for the relationship between demands and performance relates to evidence that certain stressors can have positive effects on performance. A small
number of studies (LePine, et al., 2005; Rodell & Judge, 2009; Wallace, et al., 2009) have shown that if a stressor is appraised as a challenge, rather than a threat, the condition tends to be positively related to performance (Beehr et al., 2000). The positive-linear model explains the expected positive relationship between challenge-based stressors and performance, arguing that when a stressor is appraised primarily as a challenge it may lead to internal arousal and higher performance outcomes (LePine, LePine, & Jackson, 2004). This positive conceptualisation of certain stressors accords with the DCS model (Karasek & Theorell, 1990), which acknowledges that stressors are not always harmful, but can indeed have a positive influence on performance when the job is perceived as challenging (Karasek & Theorell, 1990). For example, in a study based on the positive linear model of stressors, challenge stressors perceived as under the control of the employee, such as high workload and stressful demands, were delineated from hindrance stressors not under control of the employee, such as organisational politics and role ambiguity (Wallace et al., 2009). Results showed that challenge stressors were positively correlated with task performance, although not with citizenship behaviour (Wallace et al., 2009). The differing outcomes for task performance and citizenship behaviour contrast with the current finding that higher workload was associated with higher levels of IRB, OCB-O and OCB-I.

Another noteworthy finding from the current study was that workload was positively associated with both OCB-I and OCB-O. This result diverges from previous research suggesting that extra-role behaviours could be expected to diminish due to available resources being exhausted in dealing with the job stress (Bakker, et al., 2004; Turnipseed & Murkison, 2000). There is some evidence, however, of a positive relationship between workload and OCB. An investigation of social support, job stress and OCB among nurses found that workload was positively related to OCBs (Chu, Lee, & Hsu, 2006). A high workload was proposed to simultaneously increase feelings of personal
accomplishment and work identification and these positive emotions, in turn, generated OCB (Chu, Lee, & Hsu, 2006). Competencies and helping behaviour have been found to be highly correlated, indicating that when employees feel competent in their work they are more likely to engage in OCB (Todd & Kent, 2006). The finding that competencies and OCB are related would appear to link with the challenge stressor argument, suggesting that work stressors perceived as challenging can positively influence various types of performance. In light of this evidence, public sector managers would be advised to ensure that employees undertaking high workloads perceived themselves as competent and their tasks as challenging, in order to optimise performance.

**CWB in relation to stressors**

The broader conceptualisation of performance in the current study included CWB as a measure of discretionary, yet undesirable work performance. CWB expectedly yielded inverse results to those of the other three performance measures. However, the finding that CWB was negatively related to workload is counter-intuitive, given that CWB is conventionally expected to increase under stressful organisational conditions (Chen & Spector, 1992; Fox & Spector, 1999). The first possible explanation for the negative relationship that was found between workload and CWB involves the challenge stressor argument. One study investigating challenge and hindrance stressors and extra-role behaviour found challenge stressors exhibited a negative relationship with CWB (Rodell & Judge, 2009), implying that experiencing challenge stressors such as increased job responsibility and complexity, would decrease acts of withdrawal, including tardiness and cyber-loafing. This outcome suggests that stressors perceived as challenges, as opposed to threats, can promote attentiveness rather than negative anxiety. However, as CWB was positively associated with psychological distress in the current study, the association between workload and CWB is potentially more complex.
A further explanation for the negative relationship between workload and CWB relates to stressors that are perceived as threatening. In contrast to task performance and organisational citizenship behaviours, CWB can be a response to ineffective coping with job stressors (Cullen & Sackett, 2003) and has been categorised as a special case of job strain in the job stress process according to the Stressor-Emotion model of CWB (Fox & Spector, 2006). The model proposes that a combination of perceived stressors and insufficient control is likely to activate negative emotions, which in turn increases the probability the employee will engage in CWB (Fox & Spector, 2006). Although it follows that stressors such as increased workloads would be associated with higher levels of CWB, the authors suggest the immediate impulse to act is frequently inhibited until a subsequent time, often long after the emotion has subsided (Fox & Spector, 2006). With regard to CWB in particular, behaviours may be planned in advance and enacted only when suitable opportunities arise (Fox & Spector, 2006). This time lapse between a negative emotional response to a stressor and the enactment of CWB could explain the current finding that increased workload was associated with lower levels of CWB. It is possible that during times of high workload there is no opportunity for employees to carry out behaviours such as spending excessive amounts of time on personal phone calls and emails, taking undeserved breaks and neglecting aspects of work that they are obligated to perform.

Given the differing potential explanations for the negative relationship between workload and CWB, it is useful to consider that higher levels of CWB were also associated with diminishing support, lower commitment and higher psychological distress in the current study. This outcome demonstrates that it is important for managers to be aware that CWB comprises detrimental behaviours that employees may engage in when their experiences or attitudes are negative, provided the opportunity arises.
The role of resources in relation to performance

The results of Study 2 strongly support the link between resources and performance. In terms of the DCS, resources include job control and both forms of social support (work and non-work). Both the DCS and COR theory (Hobfoll, 1989) consider adequate resources to be critical in effectively handling the demands of the job and limiting emotional exhaustion. An alternative explanation for the positive association between organisational citizenship behaviour and workload in terms of COR theory is that individuals seek to protect and conserve important resources including attitudes, such as a positive outlook and a high level of energy (Hobfoll, 2001). When workloads are increased to the extent that personal resources are under threat, employees may respond by using citizenship behaviours as a means of building social capital, consequently reducing energy loss (Hobfoll & Shirom, 2000). Previous research has found that employees often perform organisational citizenship behaviours directed towards other individuals (OCB-I) in order to build social capital within organisations (Bolino, Turnley, & Bloodgood, 2002) and engaging in OCB-I is one means of bolstering support systems and coping resource repertoires (Halbesleben & Bowler, 2007; Webster, et al., 2010). Further, citizenship behaviours directed towards the organisation (OCB-O) have been found to be generated when workers are treated with respect and have significant levels of autonomy (Hodson, 1999). Together, these studies suggest that OCB, rather than diminishing under heavy workloads, is employed as a means of building and conserving resources. Managers therefore need to be aware of positive forms of citizenship behaviour and make the effort to encourage these behaviours amongst employees with heavy workloads. Promoting OCB in the workplace is expected to increase social capital and limit resource loss, consequently improving performance.
A resource important to both in-role and extra-role performance in the current study was job control. Job control was positively associated with OCB-O. This outcome adds to existing evidence that the highest levels of OCB-O, involving pro-social behaviours that contribute to organisational effectiveness, depend on significant job control (Hodson, 1999). In addition, job control was positively linked with IRB. The control component of the model involves employees’ capacity to organise their work via decisions regarding their own activities and skill usage (Ganster, 1989). Therefore, control alone, which is fundamentally the individual’s belief in personal control (Fox, et al., 1993), may increase feelings of mastery, personal accomplishment and work identification, consequently raising levels of IRB. On the other hand, because causality cannot be inferred in a cross-sectional study, it is also possible that undertaking high levels of IRB may increase feelings of mastery and personal control in the work environment. In a study that examined the effects of different types of control on performance among a sample of 1585 hospital employees, Yoon and colleagues (Yoon, Han, & Seo, 1996) found a positive relationship between control, in the form of choice, and performance. Employees with more choice in the way they carried out their jobs (less routinisation) had higher levels of performance. It was concluded that routinisation reduces the amount of choice available to an employee, which is directly damaging to the sense of control. The authors suggested that the detrimental effect of routinisation stems from constrained job variety and range of options for carrying out work tasks, which increase job repetition.

The relationship between job control and IRB was indirect, as it was fully mediated by job satisfaction. This finding appears to indicate that the level of job control influences job satisfaction, which in turn influences the level of IRB. Evidence of the link between job satisfaction and performance has been found in previous studies. In a longitudinal study of the effects of control on job satisfaction and performance (with a six month time
lag) the hypotheses that control would significantly predict the explained variance in overall job satisfaction and performance were supported (Greenberger, et al., 1989). Two studies including 149 nursing service employees and 400 clerical workers confirmed that control possessed by employees may be both a cause and outcome of both job satisfaction and performance. Personal control possessed by employees was positively and reciprocally related to performance and satisfaction at static points and over the measured time period (Greenberger et al., 1989). It was suggested by Greenberger and colleagues (1989) that a self-reinforcing learning loop may account for perceptions of control increasing performance, which then influences the level of control.

**The importance of social support**

There is a lack of research that investigates the way that stressors in both the work and non-work domains can affect work performance. The current research examined social support as a critical resource and considered the role of both work and non-work support in employee performance. Results showed that all dimensions of performance were associated with non-work support and two dimensions were related to work support (when taking into account work support squared). These results parallel previous evidence that non-work support is as important as work-based support (Munro, Rodwell, & Harding, 1998; Sargent & Terry, 2000). Non-work support had a main effect on all outcome variables, indicating linear relationships.

Regardless of whether relationships were linear or curvilinear, both forms of support were positively related to performance. Employees with greater degrees of work and non-work support reported higher levels of IRB, OCB-O, OCB-I. There was, however, a significant indication of curvilinearity in the relationship between OCB-O and work support. When investigated graphically, there was little difference between high and low levels of support in terms of OCB-O. In the case of CWB, there was also evidence of
Curvilinearity, indicating that the highest levels of CWB occur at moderate to high levels of work support. These findings are discussed in the subsequent section on curvilinear results.

**Curvilinear effects**

There was partial support for the hypothesis that the relationship between individual DCS variables (job demand, job control and social support) and employee performance would be non-linear (Hypothesis 7). However, only one of the three DCS variables demonstrated non-linear relationships with performance. There was support for curvilinearity between work support and two of the outcome variables (OCB-O and CWB). The relationship between work support squared and OCB-O (β = .117, p <.05), and work support squared and CWB (β = -.118, p <.05), were investigated graphically using the procedures outlined by Aiken and West (1991). The relationships are depicted in Figures 1 and 2.

![Figure 1. Curvilinear relationship between work support and OCB-O at T1](image)

As can be seen in Figure 1, the line representing the relationship between OCB-O and work support is slightly curved. The highest levels of OCB-O occurred in association
with low work support and high work support. When support is perceived to be low, it is conceivable that employees seek to build their resources through engaging in OCB. On the other hand, when employees have high levels of support, they also have resources that are able to be contributed to OCB, as there will not be resource loss. In both cases, the issue is about resource allocation. There are arguments concerning resource conservation to support both of these relationships, although Halbesleben and Bowler (2007) hold that individuals would invest in OCB-I, not OCB-O, to build up their social capital as a resource.

Employees will invest resources, as a coping mechanism, where the greatest potential return on investment is possible (Hobfoll & Freedy, 1993). Employees would be expected to conserve resources for prescribed tasks and invest in OCB to develop future social support. It is possible that employees see more benefit in investing in OCB-O, therefore that is the area in which they are investing some resources as a return on investment. It is also possible that the OCB-O is being directed towards the employee’s supervisor, rather than work colleagues. The behaviours in this category of OCB focus on: work attendance; preserving organisational property; adhering to formal and informal work rules; and performing prosocial behaviour such as providing advance notice when unable to attend work. It is conceivable that these kinds of behaviours would build social capital, in line with the argument of Halbesleben and Bowler (2007), but with a supervisor rather than other colleagues. These behaviours could also serve as an investment in the development of future social support (Hobfoll & Freedy, 1993).
The other curvilinear relationship at T1 occurred between CWB and work support. As can be seen in Figure 2, a curvilinear relationship exists between work support and CWB. There are two possible explanations for this result. The first concerns the circumstances where the presence of social support appears to increase the impact of the stressor rather than alleviate it. Employees may confirm the negative beliefs that others hold in relation to the work environment which then exacerbates the level of strain experienced (Fenlason & Beehr, 1994). Discussing aversive aspects of the work environment with co-workers may appear to be a form of supporting colleagues, but this activity can result in complaints that generate negativity and anxiety associated with higher levels of strain (Fenlason & Beehr, 1994; Kaufmann & Beehr, 1986; LaRocco, House, & French, 1980).

A further explanation for the relationship between moderate-high levels of support and high CWB could be the existence of a group culture where it is the norm to engage in behaviours that serve the individual at the expense of the organisation. Each individual within the work environment is influenced by the norms of the organisational community.
Behavioural norms that have been engendered by the tradition of the community include those set by formal and informal organisational policies, rules, and procedures (Feldman, 1984; Hartman, 1996). It is possible that behaviours such as taking undeserved breaks, neglecting duties and spending excessive amounts of time on personal communications may be an accepted part of the work culture in a law enforcement agency. Previous research on law enforcement organisations has found problems within the organisational culture and the conflict between work demands and home-life is a key source of stress amongst employees (Brown & Campbell, 1990; Jackson & Maslach, 1982; Shane, 2010). In response to the perceived impingement of work on home-life and leisure time, there is a possibility that employees support each other in maximising personal gain, in terms of leisure-related behaviours such as extensive personal communications, taking of extra breaks and the corresponding neglect of some work duties.

The implication of the link between work support and greater levels of CWB is that CWB could be a sign of poor organisational climate that includes problems which the current study has not measured. CWB can be an indicator of inadequate coping with stress-inducing work conditions (Fox & Spector, 2006; Spector & Fox, 2005). This finding could indicate that there may be an opportunity to engage in behaviours that are detrimental to the organisation, yet escape consequences, if colleagues are also engaging in the same behaviours. The finding also indicates the usefulness of including CWB as an indicator of stress when investigating the relationship between psychosocial working conditions and performance.

*The role of mediation*

A unique contribution of the current study was the investigation of attitudinal and health variables as possible mediators in the relationship between stressors and performance. Researchers have raised the need to identify specific variables that operate
as mediators in the relationship between stressors and job performance (Cooper, 2008; Gilboa, et al., 2008) and the current study aimed to determine whether the association between stressors and psychological well-being was more dominant than the job attitudes pathway.

In general, the results of Study 2 provided limited support for attitudinal variables as mediators of the stressor performance relationship. Job satisfaction fully mediated the relationship between job control and IRB, whereas commitment partially mediated the relationship between job control and OCB-O. Neither health variables (psychological well-being and psychological distress) were mediators of the relationship between stressors and performance. However the role of satisfaction and commitment, rather than health variables, in mediating the stressor-performance relationship suggests that performance improvement could be approached from an attitudinal perspective. Instead of relying solely on stress prevention strategies to enhance the productivity of employees, managers would be advised to also address satisfaction and commitment levels.

The findings involving the intermediate variables highlight that it is important to consider the distinction between in-role and extra-role performance in the context of attitudinal variables, and the psychological response mechanisms operating within the attitude formation process. Contrasting with previous evidence that the relationship between job satisfaction and OCB was stronger than the relationship between satisfaction and in-role performance (Organ & Ryan, 1995), in the current study job satisfaction was a significant mediator for only IRB. Commitment, although only a partial mediator of the relationship between OCB-O and job control, was a significantly associated with all performance outcomes with the exception of IRB. Previous research has identified that decreased organisational commitment may occur when employees with low decision latitude are unable to recognize the connection between their role and the achievement of
organisational goals (DeCotiis & Summers, 1987). In addition, a lack of organisational commitment can manifest as withdrawal behaviours including exerting less effort on the job and ignoring work tasks, resulting in impaired work performance (Anton, 2009; Jamal, 1985). The association between lack of commitment and withdrawal behaviours parallels the finding of a negative relationship between CWB and commitment in the current study.

**Employee performance in the context of NPM**

The results relating to attitudinal variables suggest that addressing both satisfaction and commitment is necessary in order to enhance employee productivity and these findings could be of particular significance to public sector organisations operating under NPM reforms. The structural and procedural changes accompanying NPM reforms have been found to impact on employee performance through increased levels of dissatisfaction (Mikkelsen, Saksvik, & Landsbergis, 2000; Yang & Kassekert, 2010) and decreased organisational commitment (Young, Worchel, & Woehr, 1998). Given the results of the current study, it is important that researchers continue to investigate the role of satisfaction and commitment in employee performance. Further investigation of the relationship between attitudinal variables and performance would benefit public sector agencies, which are required to manage the constraints associated with NPM and also provide an environment that enhances satisfaction and performance.

The findings of the current study challenge the assumption that a reduced workload will necessarily facilitate performance through alleviating stressful working conditions (LePine, et al., 2005; Wallace, et al., 2009). Higher levels of desirable performance and lower levels of undesirable work behaviours were associated with higher workloads, indicating that a heavy workload is not necessarily experienced as a detrimental stressor, but can be a challenge to enhance performance. This is an encouraging result in the context of NPM. Given that public sector reforms are ultimately about improving the
effectiveness of state-funded agencies and employee performance is central to organisational effectiveness, it is important to distinguish conditions that contribute to optimum performance. Managerialist reforms have been generally associated with increased stress, declining commitment and rising dissatisfaction (Ibsen, et al., 2011; Korunka, et al., 2003; Mikkelsen, Saksvik, et al., 2000), therefore it is vital to identify potentially stressful working conditions and their impact on performance. In the present study demand was shown to be a positive contributor to performance. In addition, greater degrees of work and non-work support were associated with increased levels of in-role and extra-role performance. The implications of these findings in relation to the public sector and NPM are that creating conditions that enable employees to feel challenged and supported may balance the adverse effects associated with managerialist reforms.

**Summary of Study 2**

The results of Study 2 are consistent with previous research suggesting that working conditions are associated with variability in levels of performance as a consequence of common job stressors. The DCS variables collectively accounted for significant amounts of variance in both in-role and extra-role performance, implying that addressing working conditions may assist in optimising performance. There was some evidence that job attitudes operate as mediators in the stressor-performance relationship, indicating that managers should also approach performance improvement from an attitudinal perspective. Instead of relying solely on stress prevention strategies to enhance the productivity of employees, satisfaction and commitment levels could also be addressed. Both managers and researchers should be aware of the importance of resources in relation to employee performance, but not assume that relationships are linear, especially in regard to support. Further, the use of a broader range of performance measures including negative discretionary behaviour proved fruitful as CWB yielded
differential results to those of the other three performance measures. Overall, the finding that a heavy workload can be a challenge to enhance performance, with work- and non-work support enhancing in-role and extra-role performance, implies that public sector administrators can create working conditions that facilitate the introduction and/or maintenance of NPM reforms.

**Study 3 (Part 1) Discussion**

**Longitudinal analysis T1 - T2**

The aim of Study 3 (Part1) was to investigate whether there was evidence for long-term effects of the DCS variables on employee performance. This aim was investigated with longitudinal data collected after a time-lag of 18 months. It was hypothesised that there would be evidence of a lagged effect of demand, control and both work and non-work support on multiple dimensions of employee performance.

Additionally, the aim of the longitudinal analysis was to test for reverse causal effects in order to establish whether psychosocial working conditions and performance types mutually influence each other. Testing for reverse causal and reciprocal relationships in the current study also applied to the association between mediating variables (job satisfaction, commitment, psychological well-being and psychological distress) and performance. In one instance, there was a significant result, indicating some evidence for reverse-causality. It was revealed that greater psychological well-being at T1 was associated with greater work support at T2. This finding suggests that social support is highly dynamic and there is a reciprocal relationship between social support and psychological well-being that changes over time (Chou & Chi, 2003). Rather than mediate the relationship between demand, control, support and performance, psychological well-being would appear to have a direct yet reciprocal relationship with work support. This
finding underscores the importance of social support as a resource and associates it with personal well-being, in line with COR theory, proposing that individuals seek to protect and conserve important resources including attitudes, such as a positive outlook and a high level of energy (Hobfoll, 2001).

Overall, the results of the longitudinal regression analyses do not provide sufficient support for the relationship between stressors and performance over time. The main insight arising from the results of the panel study is that the DCS model may not be a good predictor of performance longitudinally. The possible explanations for the lack of relationship between the DCS variables and performance are examined in this section. In the following section, the results of the T1 and T2 cross-sectional studies will be compared and, finally, the general discussion section will integrate the outcome of the non-significant longitudinal study with the outcomes of the two cross-sectional studies. In making these comparisons, emphasis will be given to the nature of performance and differences between the performance types that could account for the capacity of the DCS model to predict cross-sectional but not longitudinal results.

One reason that longitudinal studies might fail to find significant results between DCS variables and employee outcomes, could be that effects may take place within a few months rather than periods of a year or more (DeJonge et al., 2001). A further possibility is that employees have the ability to anticipate the future and the reoccurrence of stressful situations, and they can act to prevent this provided the opportunity is available (Fay & Sonnentag, 2003). If this latter explanation is the case, conditions will vary at each time point in the study and relationships may not hold over time. However, it should be noted that even though a time lag that is too long can lead to an underestimation of the true causal impact of stressors, time lags that are too short may infer that no causal effects exist at all (Zapf, et al., 1996). Therefore, periods of longer than a year are recommended and
further research should aim to test time-lags in addition to the 18-month lag investigated in this research.

**Study 3 (Part 2) Discussion**

**A repeated cross-sectional analysis**

In order to test the robustness of the Study 2 (T1) results, a second cross-sectional study was conducted using data from T2. The strict replication in the current investigation involved closely following as many aspects of the Study 2 (T1) as possible, in terms of population, sampling procedure, measurement techniques, analysis and methods (Darley, 2000). The only variation between the two studies was a difference in the number of participants (n = 647 T1, n = 581 T2). A significant reason for conducting a replication study is to confirm findings from a previous study, especially when the results are unexpected or unusual, such as the current strong finding of positive demand-performance relationships (Morrison et al., 2010).

When interpreting the results of the replication study, the discussion section needs to juxtapose the results of the replication analyses with the results of the original study. The two studies need to be considered together irrespective of whether contradictory results arise (Morrison, et al., 2010). As a result of these recommendations, the results of the cross-sectional analyses at T2 will be juxtaposed with those from the cross-sectional study conducted at T1.

**Juxtaposing the T2 results with the T1 results**

The process of juxtaposing the T1 and T2 cross-sectional findings resulted in eight notable similarities/differences being identified. These are as follows:
1. Direct effects where the individual DCS variables predicted performance outcomes were apparent in both cross-sectional studies. Hypothesis 1, predicting that demand, control and support will each be significantly associated with performance, was supported at T1 and partially supported at T2, as job control was not significantly associated with any of the performance variables at T2. Workload and non-work support significantly predicted all four outcome measures at both T1 and T2. All the relationships in the second study were in the same directions as the first study. There were positive relationships between desirable forms of performance (IRB, OCB-O and OCB-I) and both workload and non-work support. In the case of undesirable performance, CWB had a negative relationship with workload and with non-work support.

Given that demand was positively related to desirable forms of performance and negatively related to undesirable performance in both studies, the findings suggest that high demands are not detrimental to performance in circumstances where employees are able to conserve or build adequate resources. The positive relationship between demand and performance supports the argument that stressors can be perceived as challenges which can enhance performance provided resources are adequate (LePine, et al., 2005; Webster, et al., 2010). This finding has particular relevance for OCB in terms of resources. As previously outlined in relation to the T1 results, rather than diminishing under heavy workloads, OCB is employed as a means of building and conserving resources. Managers therefore need to be aware of positive forms of citizenship behaviour and make the effort to encourage these behaviours amongst employees with heavy workloads. Promoting OCB in the workplace is expected to increase social capital and limit resource loss, consequently improving performance.

2. The vast majority of the explained variance in the relationship between working conditions and performance, in both T1 and T2 studies, was attributed to the additive
effects of demand, control and support. This result would imply that addressing psychosocial working conditions, independently of each other, may assist in maintaining the resource levels associated with effective performance. An additive model also explained more of the variance in OCB than in IRB in both studies, as hypothesised. This result indicates that extra-role behaviour is a reflection of the resources available to workers. OCB is discretionary and therefore more variable than IRB. Employees have more control over their capacity to change their voluntary contributions than their prescribed tasks, in response to their current level of resources (Bakker, et al., 2004).

3. The hypotheses predicting that two-way and three-way multiplicative models (5 & 6) would explain additional variance in employee performance over an additive model were not supported in either study. There were no interaction effects detected in the regression analyses across the two data sets and this result suggests that, in the current study context, the interactive DCS model is not a strong predictor of employee performance. The lack of interactive effects found in studies using the DCS model has been an issue identified by numerous authors. In a critical examination of the DCS model, De Jonge and Kompier (1997) argued that interactive effects were predicted but not often found, or when found were statistically weak or not of a type predicted (de Jonge & Kompier, 1997). It has also been suggested that methodological aspects, such as the presence of non-linear relationships, can have an influence on whether interactive effects are detected (de Jonge & Kompier, 1997; Muse, et al., 2003). It is important to include curvilinear terms in the research design to increase the likelihood of finding interactions, should they exist (de Jonge, Reuvers, et al., 2000). Given that most job stress studies using the DCS do not include curvilinear terms, it follows that interactive effects are not commonly found (de Jonge, Reuvers, et al., 2000; Muse, et al., 2003). Future research examining the relationship between working conditions and performance using the DCS
should still test for interaction effects (de Jonge, Reuvers, et al., 2000), although, on the basis of the results for the current study, these interactions are unlikely to be supported.

4. The $R^2$ value in the final step was significant for all four performance outcome variables at both T1 and T2. The only exception here was for OCB-I at T1, where the final $R^2$ was not significant. The implication of this result is that performance is highly variable and may be affected by various factors at different time points. It is therefore important to include cross-sectional and longitudinal analyses in future studies of job stress and performance in an effort to identify the consistent predictors of performance in relation to psychosocial working conditions.

5. Job control was a significant predictor of two forms of performance (IRB and OCB-O) in T1. In T2, job control squared was associated (negatively) with one of the performance variables, namely CWB. Workload, by contrast, predicted all forms of performance at both time-points. Therefore, it would appear that workload is associated with positive forms of performance (as it is also related to lower CWB) independently of control. This outcome contrasts with previous findings of the benefits of high control in conjunction with demand (Fox, et al., 1993; Hockey & Earle, 2006). However, supporting evidence for the absence of favourable effects of control on performance outcomes does exist. In an experimental study on the effects of demand and control on task perceptions and performance accuracy, Flynn and James (2009) found that manipulations altered perceptions of control but not demand. This finding suggested that a reduction in demands was not experienced as one of the beneficial effects of job-related control. The proposition that workers with control will necessarily use decision latitude to reduce their workload has been questioned in previous research (e.g., Searle et al., 1999; 2001). In addition, it has been suggested that workers are not cognisant of whether the use of decision latitude
results in an actual reduction of workload or merely a perception that does not correspond with objective reality (Flynn & James, 2009).

6. In both cross-sectional studies only OCB-I had a direct linear relationship with work support, although the final step of the regression was not significant in T1. High levels of work support were associated with high levels of OCB-I at one time point, providing some evidence of a link between the support of work colleagues and engaging in OCB-I as a form of social capital. An explanation for this result could be that employees seek to build support through OCB-I, and that this form of voluntary behaviour is highly variable in accordance with the needs of the individual in any given situation. To enhance their resources, employees may build social capital through helping colleagues. Previous research has found that employees often perform organisational citizenship behaviours directed towards other individuals in order to build social capital within organisations (Bolino, et al., 2002) and engaging in OCB-I is one means of bolstering support systems and coping resource repertoires (Halbesleben & Bowler, 2007; Webster, et al., 2010). The current finding that social support is positively related to performance, even though it does not alleviate stressors, confirms that resources are critical to high levels of performance as worker output depends heavily on the amount of resources available for task accomplishment (Beal, et al., 2005; Luchman & González-Morales, 2013).

7. Some evidence of non-linear relationships occurred in both studies, although the degree of curvilinearity was only slight and none of the relationships were the same at T1 and T2. The curvilinear relationships for the T1 results were presented in Figures 1 and 2. The curvilinear relationships analysed at T2 are illustrated in Figures 3 to 5.
Figure 3. Curvilinear relationship between job control and CWB at T2

As illustrated in Figure 3, moderate levels of job control were associated with the highest levels of CWB. It is possible this finding indicates that the maximum opportunity for employees to perform CWB is when they have moderate levels of CWB. The Stressor-Emotion model of CWB (Fox & Spector, 2006) posits that a combination of perceived stressors and negative emotions increases the probability the employee will engage in CWB. However, behaviours may be enacted only when suitable opportunities arise, and individuals are able to engage in CWB without attracting attention (Fox & Spector, 2006). It is conceivable that employees with low levels of job control may not have the freedom to engage in CWB. There is evidence that people will wait for an opportunity to perform CWB (Spector & Fox, 2005) and they require some autonomy to be able to perform self-serving behaviours that are detrimental to the organisation. Employees with low control may not be in a position where they can choose to perform these discretionary behaviours over their work tasks. At the other extreme, those individuals with high levels of control may have positions that also entail high levels of responsibility and visibility, thus preventing them from performing behaviours that would set a poor example for co-workers.
As shown in Figure 4, employees with the lowest non-work support and the highest non-work support have higher levels of IRB than those with moderate levels of non-work support. This implies that support outside work is important in terms of work performance. According to the work-family enrichment argument, when people have family support there is a positive spill-over to their work performance (Burke & Greenglass, 1987; Lambert, 1990), which appears logical in terms of high non-work support being associated with high IRB. However, the results also imply that people with low support outside of work have higher levels of IRB, which does not fit with the spill-over argument. A possible explanation for this latter outcome is that certain individuals highly identify with their work and so they invest more of their resources there than at home. This investment of resources equates with the hope of future returns (Hobfoll & Freedy, 1993). Resource allocation in relation to home and work can be explained in two ways. People carefully consider where to invest resources for best return, and when employees are in a position where they find they have excess resources, they can then channel more resources into
performance. Alternatively, low non-work support associated with high IRB could be explained by the work-family conflict or facilitation argument (Voydanoff, 2004). This perspective holds that the perception of work-family conflict or facilitation depends on an individual’s assessment of the extent to which the demands of the environment hamper or resources improve the performance of work or family roles (Voydanoff, 2005). Work-family conflict occurs when the requirements and responsibilities of work and family roles are incompatible to a certain degree, making participation in one domain more difficult as a result of participation in the other (Greenhaus & Beutell, 1985). It can therefore be argued that if more of an individual’s resources are being expended on IRB in the work environment, there is a deficit of resources that they can contribute at home and, in turn, there is also less support being experienced at home. Both the work-family enrichment and the work-family conflict perspectives are concerned with resource allocation in the domains of work and family, which fits with COR theory (Hobfoll, 1989). Either there is a deficit of resources in one domain because resources are primarily allocated to the other domain, or there is enrichment of resources in one area that spills over in a positive way to the other domain.
As can be seen in Figure 5, those employees with the highest non-work support reported the lowest levels of CWB. This finding indicates, once again, that family support can be transferred to the work environment in a positive way (Grzywacz & Butler, 2005; Montgomery, Peeters, Schaufeli, & Ouden, 2003). Non-work support appears to have positive benefits for work performance in terms of desirable and undesirable behaviours. High levels of non-work support are associated with greater IRB and lower levels of CWB. Given that none of the relationships were the same at both time points and the curves were not pronounced, it can be concluded curvilinearity was not a major factor in the current study. Nevertheless, the indication that non-linear results are possible in the relationship between DCS variables and performance suggests that curvilinear terms should at least be considered for inclusion in future DCS research, as recommended by previous authors (De Lange, et al., 2004; Muse, et al., 2003).

8. There was only one case of partial mediation in the cross-sectional analyses at T2, which is in contrast to the two mediating relationships found at T1. In both studies, a number of the mediating variables reached significance in the final step of the regression
however mediation was only validated in a total of three cases across T1 and T2 combined. At T2, only one of the Sobel tests for mediation reached significance. The only mediating variable that was not significantly related to any of the performance variables in any of the regressions, either directly or indirectly, was psychological well-being. Overall, there was some support for mediation occurring in the relationship between psychosocial working conditions and performance at both T1 and T2. In the first instance there were two significant results, and in the second there was one. Job satisfaction fully mediated the relationship between job control and IRB, and affective commitment partially mediated the relationship between job control and OCB-O at T1. Affective commitment partially mediated the relationship between work support and OCB-I at T2.

The results involving mediation would suggest that there is some evidence for the mediating effects of attitudinal variables, however, this finding is not consistent. Different mediating relationships were found at each time point. Nevertheless, conclusions about the importance of mediation need to be drawn and this will be addressed in the forthcoming section discussing general results of the current study.

In summary, there were a range of similarities and differences between the two cross-sectional studies. Direct effects, involving the individual DCS variables and performance outcomes, were apparent in both cross-sectional studies and all relationships were in the same direction in both studies. OCB-I was the only performance outcome where the mediating variables did not reach significance in the final step of one of the studies (T1). The most prominent finding in both studies was that workload was positively associated with desirable types of performance (IRB, OCB-I and OCB-O) and negatively associated with CWB. The vast majority of the explained variance in the relationship between working conditions and performance was attributed to the additive effects of demand, control and support in both studies and there were no interaction effects in either
study. Job control was a significant predictor of two forms of performance (IRB and OCB-O) in T1, and high levels of support were associated with high levels of OCB-I, also at T1. There was some evidence of non-linear relationships in both studies, although the degree of curvilinearity was only slight and none of the relationships were the same at T1 and T2. Finally, the single mediating relationship at T2 contrasted with the two mediating relationships found at T1.

**Investigation of possible variation in conditions**

As outlined in the juxtaposition of results, there were some differences between the results of both studies. It was therefore necessary to ascertain whether the conditions varied between T1 and T2, and to investigate why job satisfaction fully mediated the relationship between job control and IRB at T1 but not at T2. This was done through inspecting the means of all the variables. The demographics were similar in terms of age, gender and tenure. All the means for the predictors and outcome variables, with the exception of job control, job satisfaction and IRB, were much the same, only varying by one unit in two instances. In the case of job control, job satisfaction and IRB, however, the means and standard deviations varied considerably, by up to 29 units (see Tables 4 & 11). The differences are as follows: Job control T1 (M = 31.91, SD = 4.62), job control T2 (M = 21.50, SD = 4.20), job satisfaction T1 (M = 13.70, SD = 4.14), job satisfaction T2 (M = 42.49, SD = 11.79), IRB T1 (M = 30.46, SD = 3.13), IRB T2 (M = 25.57, SD = 2.46).

Overall, at T1, job control was lower, job satisfaction was much lower, and IRB was higher than at T2. To investigate further, the predictors of job satisfaction were inspected, via the regressions that were performed with mediating variables as outcome measures at T1 and T2 (see Tables 5 and 12).

The tables show that there were differences in the predictors of job satisfaction at T1 and T2. At T1, job satisfaction appears to be predicted by only three DCS variables,
namely job control ($\beta = .296, p < .01$), work support ($\beta = .272, p < .01$) and non-work support ($\beta = -.066, p < .05$). On the other hand, at T2 job satisfaction is predicted by five variables. These predictors consist of job control ($\beta = .284, p < .01$) work support ($\beta = .226, p < .01$), non-work support ($\beta = -.108, p < .01$), workload squared ($\beta = -.140, p < .01$) and an interaction term; workload x work support ($\beta = -.086, p < .05$).

It would appear that the relationship between job control and job satisfaction is complex, given that job satisfaction can be influenced by a range of factors in addition to job control. It has been found that deteriorations in mood and performance can occur when control increases perceptions of demand, whereas control interpreted to reduce demands has beneficial effects on psychological and behavioural outcomes (Hockey & Earle, 2006).

At T1, perceptions of control were lower, whereas IRB was rated higher than at T2. (It is important to note that the current investigation was designed to measure the perceptions of employees in regard to their psychosocial working conditions and therefore performance is self-rated). If it was the case that positive perceptions of control could have beneficial psychological effects, then it is feasible that job control could contribute to job satisfaction and, in turn, contribute to IRB. Possibly the difference in the relationship between job control, job satisfaction and IRB at T1 (a significant relationship with full mediation) and T2 (no mediating relationship between the variables) is related to perceptions regarding control. Employees’ perceptions that they have a lower amount of control could decrease their level of job satisfaction and, in turn, may influence their perceptions of their job, with emphasis given to prescribed behaviours (Hockey & Earle, 2006). The IRB items in the revised measure relate to completing the duties specified in the job description, performing the tasks expected, and meeting the formal requirements of the job. It is possible that comparatively lower levels of control and job satisfaction may influence employees to focus on performing what is expected of them, in contrast to discretionary behaviours.
The proposition that perceptions of control can have effects on psychological and behavioural outcomes could help explain the mediating effect of job satisfaction in the relationship between job control and IRB. As well as the difference in levels of control and satisfaction at T1 and T2, the predictors of job satisfaction varied somewhat between the two studies. This variation in predictors may point towards an additional psychological response mechanism in operation. Job satisfaction can be based on many aspects of the work environment (Fisher, 2003), and has been considered as a measure of psychological well-being in job stress literature, as has affective commitment (Van der Doef & Maes, 1999; Warr, 1990b). Therefore, employee perceptions related to job resources such as control may also explain why commitment partially mediated the relationship between control and OCB-O, as commitment may be associated with psychological effects of control that, in turn, influence performance. This link between perceptions and resources can be explained using the COR theory.

According to the COR theory, some key job resources may have a perceptual component, such as self-efficacy (Hobfoll, 2001). As emphasised by the theory, through successfully meeting challenges, individuals will be able to change objective circumstances, thereby augmenting perceptually based resources (Bandura, 1997). This could mean that, in addition to the overall level of job satisfaction, the components contributing to job satisfaction are important. It is possible that self-efficacy (a perceptually based resource) is a component of job satisfaction that is related to job control. Therefore, in certain circumstances, job control may contribute to job satisfaction and performance through self-efficacy. It is highly possible that perceptual variables not measured in the current study, such as self-efficacy, could be important contributors to job satisfaction and performance. Despite the intuitive appeal of the role of self-efficacy in contributing to job satisfaction and performance, this needs to be examined further.
The findings of Study 1, Study 2, Study 3 (Part1) and Study 3 (Part2) have been discussed in this section. It is necessary to clarify that the findings of these studies are not conclusive, given that they relate to cross-sectional analyses and there were no significant longitudinal results (with the exception of a reverse–causal result for one mediating variable). Notwithstanding, the findings do contribute to the understanding of the relationship between psychosocial working conditions and performance, and the next section will extend the discussion of the most important findings in more detail.

**Extended Discussion**

This extended discussion section will focus on the most prominent findings identified in the current investigation and consider their implications for research and practice. First, the relationship of demand to job performance will be discussed, in addition to differences between the effects of stress on health and performance, and also the significance of differentiating between performance types. Then, the importance of social support as a resource will be outlined, followed by the findings in reference to public sector organisations. The concluding section of the thesis will summarise the contributions, implications, limitations and recommendations for future research.

**Positive association between demand and performance**

In previous job stress research, reducing high job demands has commonly been identified as a way of improving employee well-being (Hausser, et al., 2010; Van der Doef & Maes, 1999). However, insufficient consideration has been given to how this could be achieved, particularly in working environments (such as many public sector organisations) where the ‘doing more with less’ approach has become the norm rather than the exception. The current study was based on the rationale that the relationship between psychosocial working conditions and performance was under-researched, and a better understanding of
the relationship may provide insights into how agencies operating in cost-conscious environments can manage working conditions in a way that has a positive influence on the in-role and extra-role contributions of employees.

One of the most important findings in the current study was that workload was the strongest predictor of performance, predicting all four types of performance, at both time points. The positive relationship of workload to all types of desirable performance, namely higher levels of IRB, OCB-I and OCB-O and lower levels of CWB associated with higher workload, illustrates that it is possible for demands to enhance rather than diminish performance. An implication of this result for future investigations of psychosocial working conditions and performance is the understanding that stressors such as job demand may have positive effects on performance. This position is contrary to the results of stressor-performance which generally indicate that stressors are detrimental to employee performance, characterised by a negative linear relationship between the variables (Cynkar, 2007; Fay & Sonnentag, 2002; Gilboa, et al., 2008).

Despite the majority of stressor-performance research holding that stressors are harmful to performance, the potential for high demands to positively influence motivation, participation and learning in the workplace was hypothesised by Karasek and Theorell (1990). The perspective that stressors can have positive effects on performance also supports the challenge-hindrance stressor argument. Stressors can facilitate goal achievement through enhanced effort, therefore the challenge-hindrance stressor model proposes that performance will increase rather than decrease when a stressor such as high workload is experienced as a challenge (LePine, et al., 2002; Webster, et al., 2010). In the event that high performers take on additional tasks and responsibilities and are motivated to perform them well, heavy work demands can be perceived as a challenge that is positively, rather than negatively, associated with performance. A positive challenge will
be experienced provided the employee has adequate resources and competencies to handle the high demands they are tasked with (Karasek & Theorell, 1990; Sargent & Terry, 2000).

The positive relationship between workload and performance can alternatively be explained in terms of resource conservation, when specifically applied to OCB. The COR theory holds that individuals aim to conserve essential resources including high levels of energy and an optimistic outlook (Hobfoll, 2001). OCB can serve to build social capital and reduce energy loss in response to increased workloads that threaten the personal resources of employees (Hobfoll & Shirom, 2000). Engaging in OCB-I is a means of augmenting support systems and coping repertoires (Halbesleben & Bowler, 2007; Webster et al., 2010) and there is evidence that employees perform OCB-I for the purpose of building social capital in work environments (Bolino et al., 2002). With regard to OCB-O, employees possessing high levels of autonomy, who are also treated with respect, tend to engage in this type of discretionary performance that benefits the organisation (Hodson, 1999).

Instead of decreasing under heavy workloads, evidence suggests that participants engage in OCB as a form of building and conserving resources. The implication from this finding is that managers need to be aware of positive forms of citizenship behaviour and proactively encourage these behaviours amongst employees with heavy workloads. If managers can recognise and promote OCB in the work environment, social capital can be increased and resource loss can be reduced, leading to positive consequences for job performance.
The difference between research into effects of stressors on health and performance

The second important finding identified in the current study also involves the challenge stressor argument. Contrary to previous evidence indicating that stressors are detrimental to health/well-being and performance (Cynkar, 2007; Fay & Sonnentag, 2002; Gilboa, et al., 2008), the current results suggest that a stressor such as high workload can have a positive influence on performance if perceived as a challenge. The majority of work stress literature takes the perspective that high workloads are detrimental to health and well-being and that reducing demands will benefit employees and organisations. These benefits are expected to include a reduction in the number of workers compensation claims and lost productivity due to sickness absence (European Agency for Safety and Health at Work, 2011; Macklin, et al., 2006).

The current study considered the alternative side of the argument. That is, higher job demands lead to improved employee outputs. The broadly accepted view regarding psychosocial working conditions is that resources such as control and social support enhance health or well-being whereas demands are held to be job stressors detrimental to employee outcomes. The issue underlying this view, which has been applied largely to health outcomes, is that resources like job control and social support aid employees in effectively coping with stress-inducing working conditions by buffering the harmful effects of demands. Paradoxically, it has been suggested that stressors such as demands may be harmful to health but beneficial to productivity (Daniels & De Jonge, 2010).

The proposition that high demands may be beneficial to productivity is important to consider as demands cannot always be reduced, although there may be more opportunities for jobs to be redesigned to reduce and/or buffer negative outcomes. Employees within public sector organisations, such as the state-based law enforcement
agency from which the current sample was drawn, are expected to fulfil civil service obligations with restricted resources, time constraints and heightened accountability (Brunetto & Farr-Wharton, 2005; Wanna, O'Faircheallaigh, & Weller, 1992). In state-funded organisations where responsibility and accountability are paramount, it is often unrealistic to expect that agencies can reduce public demand for their services. The current finding supports the presence of challenge stressors as a means for enhanced performance and questions the assumption that demands should be reduced to improve working conditions for employees.

A difference would appear to exist between research examining the effects of stressors on health and research assessing the relationship between stressors and performance. There is, however, a concept of organisational assessment that takes both of these aspects into account and recommends that competing goals and objectives should be addressed to maintain optimal performance and sustainability in organisational functioning. The Integrated Framework of Organisational Health (Hoffman & Tetrick, 2003) states that a healthy organisation must take into account financial success, high productivity and a healthy, satisfied workforce. This perspective recognises that reducing high job demands as a way of improving employee well-being is of concern to organisations as it may also have the effect of reducing operational outputs. Meeting the health needs of employees at the expense of customer and client needs is an untenable situation for any organisation, especially those operating in state-funded human services where community demands are increasing at a rapid rate. The results of the present study suggest that this concern may be misguided. The current findings indicate that a reduction in demands may not be necessary to ensure productivity as long as resources, such as control and support, are adequate for employees to perform jobs effectively. This finding concurs with research suggesting that aligning major components in the organisational
design can profit an organisation in terms of reducing adverse stress-related outcomes (i.e., absenteeism and turnover) and increasing productivity (Ipsen & Jensen, 2012). Therefore, provided managers take measures to monitor and safeguard the resources and well-being of employees, high workloads can be associated with enhanced employee performance that improves organisational effectiveness.

The current study contributes to further understanding the impact of employee stress on job performance in terms of highlighting the importance of challenging working conditions, when accompanied by adequate resources, in enhancing employee performance. The finding that high demands are associated with positive employee performance should provide a greater incentive for business to address resource-based psychosocial working conditions.

**Significance of differentiating between performance types**

The basis for including a range of performance types in the current study was that job performance is an important contributor to organisational effectiveness in several ways. Job performance not only refers to the quality and quantity of work undertaken by employees as part of their prescribed roles, but also takes into account extra-role activities (O'Reilly & Chatman, 1986) and citizenship behaviours (Smith, et al., 1983). Employees who work persistently, assist others and use initiative to deal with problems are more effective and positive than employees who do not engage in these behaviours (Van Scotter, et al., 2000).

In addition to OCB, the current study developed a model of extra-role behaviour that included the construct dimension of CWB. The inclusion of CWB as an outcome variable made it possible to identify a pattern of behaviour that reduces employee performance and organisational efficiency. CWB could be classified as anti-IRB considering it includes such behaviours such as failing to perform essential tasks, along
with complaining about the organisation. This pattern of behaviour can have detrimental effects on an organisation as it is likely to undermine morale, decrease organisational commitment and adversely affect organisational culture. Information about employee behaviour that reduces the efficiency of an organisation is useful for managers who are endeavouring to optimise job performance and organisational functioning. Managers are in a position to evaluate a wider range of negative effects associated with psychosocial working conditions if CWB is included as an outcome variable in the stressor-performance relationship.

In contrast to previous job stress research commonly proposing that stressors negatively affect job performance, results of the current study revealed that higher levels of desirable performance (IRB, OCB-I, OCB-O) and lower levels of undesirable performance (CWB) were associated with higher work demands rather than lower demands. These findings contrast with previous research suggesting that extra-role behaviours could be expected to diminish due to available resources being depleted by dealing with job stress (Bakker, et al., 2004; Turnipseed & Murkison, 2000). However, some evidence of a positive relationship between workload and OCB does exist. A high workload can simultaneously increase feelings of personal accomplishment and work identification (Miles, Borman, Spector, & Fox, 2002) and these positive emotions, in turn, foster greater OCB (Chu, et al., 2006). A high correlation has been found between competencies and helping behaviour, indicating that when employees feel competent in their work they are more disposed to engaging in OCB (Todd & Kent, 2006). The relationship between competencies and OCB links with the challenge stressor argument, indicating that work stressors perceived as challenging can positively influence various types of performance. The competencies of employees is therefore important when work is challenging. In relation to people management implications, managers need to ensure
employees undertaking heavy workloads perceive themselves as competent and their tasks as challenging in order to optimise performance.

The broader conceptualisation of performance contained in the current study included CWB, which yielded inverse relationships to those of other three types of performance. Given that CWB is expected to increase under stress-inducing working conditions (Chen & Spector, 1992; Fox & Spector, 1999), the finding that CWB was negatively associated with workload appears at first to be counter-intuitive. However, in contrast to task performance and positive forms of discretionary work behaviour demonstrated as OCB, CWB can be a response to ineffective coping with job stressors (Cullen & Sackett, 2003). According to the Stressor-Emotion model of CWB (Fox & Spector, 2006), a combination of perceived stressors and insufficient control can activate negative emotions, which leads to an increased probability of the employee engaging in CWB (Fox & Spector, 2006). The authors of the model indicate that employees may plan CWB in advance but only enact the behaviours when a suitable opportunity arises. It is possible that during times of high workload there are no opportunities to carry out behaviours such as excessive use of phone and internet for personal communication and entertainment, taking undeserved breaks and deliberately neglecting work tasks. Under these circumstances, employees would only engage in CWB when their work demands were low and it was therefore possible to neglect essential duties and carry out negative behaviours with less risk of detection by supervisors.

The current study found that CWB was negatively associated with workload and that higher levels of CWB were associated with a lack of support, lower commitment and higher levels of psychological distress. These findings, in conjunction with the propositions of the Stressor-Emotion model of CWB, imply that managers need to be aware CWB comprises detrimental behaviours that employees may engage in when their
experiences or attitudes are negative, provided the opportunity arises. The current study therefore supports the proposition that OCB and CWB are distinct constructs and that they are not opposite ends of the same continuum. It is therefore important to include CWB when measuring performance as this allows identification of behaviour that goes against the system, violates organisational norms and reflects sub-role performance.

From a theoretical standpoint, the results of the current study can be seen as evidence for differential relationships of various facets of performance with job stressors. The finding that the effects of stressors differ according to types of performance lends support to a multi-dimensional conceptualisation of performance that differentiates between in-role and extra-role outputs.

The importance of social support as a resource

The results of the current study showed that social support is an important resource for participants, with both work support and non-work support being positively associated with dimensions of performance. The finding that social support was positively related to performance, even though it did not alleviate stressors, confirms that resources are critical to high levels of performance. Worker output depends heavily on the advice, feedback, assistance and other supportive resources available for task accomplishment (Beal, et al., 2005; Luchman & González-Morales, 2013), and these vital resources can come from inside and outside the work environment. The following sections will therefore address the findings relevant to work and non-work support. These findings will be expanded upon in terms of the building and conserving of resources relative to the DCS and COR models that explain the contribution of non-work support to employee behaviour which includes performance.

All dimensions of performance were associated with non-work support at T1 and T2, and two dimensions were related to work support, in line with previous evidence that
non-work support is as important as work-based support (Munro, et al., 1998; Sargent & Terry, 2000). Regardless of whether relationships were linear or non-linear, higher levels of both forms of support were associated with greater levels of positive forms of performance. The only exception to this finding applied to CWB at T1, where the highest levels of CWB were associated with moderate-high levels of work support, in a slightly curvilinear relationship. Taking the results of the two cross-sectional studies together, the highest levels of work support were associated with greater degrees of OCB-I and OCB-O, however work support was not related to IRB in either study. In terms of non-work support, higher levels of support outside work were associated with higher levels of desirable performance (IRB, OCB-I, OCB-O) and lower levels of undesirable performance (CWB).

*Work support related to performance*

The importance of work design characteristics, including social support, is emphasised in both the DCS and COR frameworks, which are resource-based concepts. Social support is a resource that can be increased through investing in supporting others (Hobfoll & Freedy, 1993), according to COR theory. The COR model predicts that, in addition to protecting existing resources, individuals will seek to develop excess resources as insurance against future resource loss during periods where they are not confronted with stressors (Hobfoll, 1989). There is evidence that social support may benefit employees in handling stressors, even when it does not decrease the stress experienced. In the current study, work support was important in terms of OCB but not IRB. This result suggests that there is a connection between extra-role behaviour and work support that does not exist between prescribed task behaviour and work-based support. The high levels of work support (taking into account work support squared) associated with greater OCB-I and OCB-O in the present study indicate that engaging in OCB-I and OCB-O could function as
a means of increasing social capital. Employees are likely to invest resources, as a coping mechanism, where the greatest potential return on investment is possible (Hobfoll & Freedy, 1993). On these grounds, it is possible that employees see the benefit in investing in OCB-O as a means of developing future social support and therefore direct extra-role behaviours towards a supervisor, a representative of the organisation.

In terms of the negative form of job performance contained in the study, CWB, there was some evidence of a slight curvilinear relationship between moderate-high work support and CWB. It is possible that, in certain circumstances, the presence of social support appears to increase the impact of the stressor rather than alleviate it. Where employees confirm the negative beliefs that others hold in relation to the work environment, the level of strain experienced may be exacerbated (Fenlason & Beehr, 1994). Under the guise of supporting colleagues through discussing aversive aspects of the work environment, co-workers may focus on complaints that generate negativity and anxiety associated with higher levels of strain (Fenlason & Beehr, 1994; Kaufmann & Beehr, 1986; LaRocco, et al., 1980).

It is also conceivable that a group culture exists where it is the norm to engage in behaviours that serve the individual at the expense of the organisation. Behavioural norms influencing the entire organisational community include those set by formal and informal organisational policies, rules, and procedures (Feldman, 1984; Hartman & Nelson, 1996). Undesirable behaviours such as taking undeserved breaks, neglecting duties and spending excessive amounts of time on personal communications may be an accepted part of the work culture in a law enforcement agency. The documented problems within the culture of law enforcement organisations due to the impingement of work demands on home-life (Brown & Campbell, 1990; Jackson & Maslach, 1982; Shane, 2010) could influence employees to support each other in maximising leisure-related behaviours at work. These
behaviours, such as extensive personal communications and the taking of extra breaks serve the individual to the detriment of the organisation.

The implication of the link between work support and greater levels of CWB is that CWB could be a sign of poor organisational climate. This finding could indicate that there may be an opportunity to engage in behaviours that are detrimental to the organisation, yet escape consequences, if colleagues are also engaging in the same behaviours. The finding also indicates the usefulness of including CWB as an indicator of inadequate coping with stress (Spector & Fox, 2005) when investigating the relationship between psychosocial working conditions and performance.

**Non-work support related to performance**

In the current study, non-work support was positively associated with desirable types of performance (IRB, OCB-I and OCB-O) and negatively associated with undesirable performance (CWB) at both T1 and T2. The finding that non-work support is related to job performance can be explained through theories that link the work and family/home domains. The existence of strong relationships among variables across work and family domains has been identified in recent literature investigating the influence the two domains have on one another (Greenhaus & Allen, 2011; Odle-Dusseau, Britt, & Greene-Shortridge, 2012). Consequently, various constructs have been developed in order to further understand the link between the work and family domains. Among such constructs, the linking mechanisms that could explain the association between support gained from non-work sources and performance are spill over, which can have either positive or negative effects, and work-family enrichment, which is a role enhancement theory (e.g., Greenhaus, Collins, & Shaw, 2003). These concepts will now be expanded upon in turn, beginning with spill over and then role enhancement theory, which encompasses work-family enrichment.
Spill over occurs when the effects of work and family generate correspondences between the two domains (Burke & Greenglass, 1987; Lambert, 1990). Attitudes, behaviours and emotions associated with one role may spill over to another role (Edwards & Rothbard, 2000). Although performance has not been investigated as an outcome, previous research on spill over effects has found that the relationship between experiences at work and psychological distress, for both men and women, was moderated by experiences in the family and, conversely, the relationship between family experiences and distress was moderated by work experiences (Barnett, Marshall, & Pleck, 1992). As these findings reveal, the association between work experiences and individual employee outcomes depends on the quality of their experiences in their non-work roles, and therefore spill over from one domain can generate either positive or negative outcomes in the other domain. This evidence of spill over effects in both domains clearly indicates that experiences in work and family roles interact in a way that requires the quality of employees' relations in both work and family roles be known before predictions can be made about the effect of experiences in either role on outcomes (Barnett, 1998).

In contrast to the majority of work-family interface literature that has focused on strain and conflicts and between the demands of work and family resulting in resource depletion, (Greenhaus & Beutell, 1985), role enhancement theory proposes that involvement in multiple roles offers more opportunities and resources to the individual that can be channelled into growth and enhanced functioning in other domains (Barnett, 1998). The role enhancement theory suggests that, rather than causing a depletion of resources, engaging in multiple roles can increase resources. Participating in multiple roles brings rewards that include income, heightened self-esteem, enhanced social relationships and the experience of achievement (Barnett & Hyde, 2001). Work-family enrichment (Greenhaus et al. 2003) is a specific type of role enhancement theory that represents a linking
mechanism (Edwards & Rothbard, 2000) explaining how experiences in a work role interact with experiences in a family role and vice versa. The enrichment theory directly challenges the proposition that people have fixed resources and suggests that energy and attention can increase (Marks, 1977). Nonetheless, both the depletion and enrichment perspectives involve complex multi-step processes that include multiple constructs such as engagement and emotion, in which the emotional response can be negative or positive (Rothbard, 2001).

It is important to note that although the evidence presented on spill over and work-family enrichment theories relates to health outcomes rather than job performance, the message is that work and non-work experiences influence each other. Both work and family domains need to be taken into consideration when investigating work attitudes and behaviours. In terms of the current study, this perspective supports the evidence that non-work support has an important influence on performance. There is also one example of research using the DCS to investigate performance that includes non-work support as a variable, which found that support beyond the work context influences work-related outcomes (Sargent & Terry, 2000).

These results indicate that resources gained in one role can enhance performance in another role. There is a home to work cross-over in terms of resources and that needs to be acknowledged by researchers and managers alike. It is important to include different types of support in studies of performance, as supporting employees in combining work and family responsibilities enhances work performance and provides objective gains for the organisation (Van Steenbergen & Ellemers, 2009). There is therefore a growing business case for managers to become more conscious of the importance of work and non-work support. Although there is some evidence that the non-work environment is important in
terms of performance (Sargent & Terry, 2000), there is a gap in the literature and more work needs to be done in this area.

**Reference to public sector organisations**

The results in regard to attitudinal variables suggest that addressing both satisfaction and commitment is necessary in order to enhance employee productivity and these findings appear to be of particular significance to public sector organisations operating under NPM reforms. Many public sector agencies, including the state-based law enforcement organisation from which the current sample of public servants was drawn, have undergone significant structural and procedural reforms in recent years (Dawson & Dargie, 2002; Pollitt, 2002). In industrialised economies including the UK, US and Australia, public sector agencies have implemented major organisational and administrative reforms modelled on the management strategies applied to the private sector. The aim of these reforms has been to generate maximum efficiency and accountability along with increased service outputs (Hood, 1995; Pollitt & Bouckaert, 2011; Steane, 2008).

The structural and procedural changes accompanying NPM reforms have been found to impact on the performance of public sector employees through increased levels of dissatisfaction (Connor, 1997; Mikkelsen, Osgard, et al., 2000; Yang & Kassekert, 2010) and decreased organisational commitment (Young, et al., 1998) generally associated with increased stress (Korunka, et al., 2003; Mikkelsen, Osgard, et al., 2000). Public sector employees are expected to fulfil civil service obligations whilst adhering to cost-containment, shorter time frames, restricted resources and performance improvement associated with the private sector (Brunetto & Farr-Wharton, 2005; Noblet, et al., 2006; Noblet & Rodwell, 2008; Wanna, et al., 1992. Research involving civil servants from a range of professional backgrounds has found that these adverse outcomes are closely
associated with the conditions captured by the DCS, namely, job demands, decision-making control and social support (Noblet, et al., 2006). It is therefore vital to identify potentially stressful working conditions and their impact on performance.

In the present study, demand was shown to be a positive contributor to performance. In addition, greater degrees of work and non-work support were associated with increased levels of in-role and extra-role performance. The implications of these findings in relation to the public sector and NPM are that creating conditions that enable employees to feel challenged and supported may balance the adverse effects associated with managerialist reforms. As previously outlined in regard to the positive relationship between workload and performance, managers need to ensure employees working under heavily demanding conditions perceive themselves as competent and their tasks as challenging in order to optimise performance. Performance feedback and other positive management strategies can help employees recognise and extend their competencies while also reinforcing their ability to meet the challenges of the job. It is vital that employees feel happy and satisfied, focused on what is important, and certain they have the competencies to achieve work outcomes. Management strategies including feedback and coaching can provide managers with the tools to help employees be more aware of their competencies and areas of challenge and have a positive impact on performance outcomes (Judge & Piccolo, 2004; Keller, 2006). Managers who are responsible for communicating with employees on a daily basis, in particular, have an important role in providing feedback to employees as they can significantly influence the way that employees experience the work environment (Lewis, Yarker, & Donaldson-Feilder, 2012).

Given the current results, it is important that researchers continue to investigate the role of satisfaction and commitment in employee performance. Further investigation of the relationship between attitudinal variables and performance would benefit public sector
agencies, which are required to manage the constraints associated with NPM and also provide an environment that enhances satisfaction and performance.

These findings would suggest that, although there is some evidence for the mediating effects of attitudinal variables, this result does not occur at each time point. Considering also that there was a similar level of job satisfaction at T1 and T2, yet there were different predictors of job satisfaction at T2, it is highly possible that perceptual variables not measured in the current study, such as self-efficacy, could be important contributors to job satisfaction and performance (Sargent & Terry, 2000). The implications of these findings regarding attitudinal variables are that instead of relying on stress prevention strategies to enhance employee performance, the job attitudes of employees should be the focus of management interventions, through addressing satisfaction and commitment levels.

**Conclusion**

The primary purpose of the current investigation was to undertake a comprehensive examination of the relationship between psychosocial working conditions and employee performance. The job stress literature has largely focused on the health and attitudinal outcomes associated with stress-related working conditions and little is known about several aspects of the stressor-performance relationship (e.g., Beehr, et al., 2000; Edwards, et al., 2007). Where the stressor-performance relationship had been examined, very few studies had tested for potential curvilinearity between working conditions and performance and most had overlooked possible interactions between job stressors. Much of the research in this area has also failed to take into account multiple performance types, were based on the assumption that heightened demands undermine performance, and had not assessed the role of intervening variables in mediating the relationship between stressors and
performance. Finally, the vast majority of the research examining the impact of psychosocial working conditions on job performance has been based on cross-sectional designs and there is a dearth of information on the longitudinal relationship between job stressors and employee performance. Given that job performance is a construct central to much of organisational psychology (Schmidt & Hunter, 1992; Viswesvaran & Ones, 2000) and has implications for the effectiveness of individual employees and the future viability of organisations, there was a clear need to undertake an extensive assessment of the stressor-performance relationship.

In order to overcome these shortcomings, the current investigation included tests for direct linear, curvilinear and interactive associations between the independent and dependent variables. The current investigation also assessed the role of four potential mediating variables; job satisfaction, organisational commitment, psychological well-being and psychological distress (Cooper & Dewe, 2008; Gilboa, et al., 2008), and, in order to develop a greater understanding of the differential effects associated with working conditions, three types of employee work behaviour were measured. These included prescribed in-role performance (IRB), positive discretionary performance (OCB) and negative discretionary performance (CWB). Finally, three studies were undertaken, the first of which was designed to examine the factor structure of the job performance measure. Although Studies 2 and 3 were designed to provide a cross-sectional and longitudinal assessment of the data, the lack of results in the primary longitudinal study, meant that a second cross-sectional study using T2 data was undertaken. This latter study served as a repeat cross-sectional investigation that enabled comparisons in the pattern of results at two different time points (T1 & T2).

The two cross-sectional studies yielded several significant results that can be used to better understand the relationships between stressors and performance. Consistent with
previous research, findings suggested that working conditions were associated with variance in performance that was attributed to the stress-related conditions represented in the DCS. The DCS variables collectively accounted for significant amounts of variance in both in-role and extra-role performance. There was some evidence that job attitudes operate as mediators in the stressor-performance relationship, indicating that managers should also approach performance improvement from an attitudinal perspective.

Resources, including job control but more specifically both work and non-work forms of social support, were closely associated with performance and demonstrated some evidence of curvilinearity. These findings suggest that social support is an important resource for employees and is critical to achieving a high level of employee performance. Importantly, these supportive resources can come from inside or outside the work environment. The potential for curvilinear relationships indicates that individual rather than population-based performance management strategies should be implemented by managers seeking to improve job performance. Further, the use of a broader range of performance measures including negative discretionary behaviour proved fruitful as CWB yielded differential results to those of the other three performance measures. This finding suggests that CWB may be an indicator of inadequate coping with stress-inducing conditions and it is therefore useful to include a measure of CWB in investigations of psychosocial working conditions and performance.

A major finding in the two cross-sectional studies was the positive relationship between workload and performance found at both T1 and T2. This finding is in contrast to the majority of prior stressor-performance research indicating that the relationship between job demands and performance is negative (Cynkar, 2007; Fay & Sonnentag, 2002; Gilboa, Fried & Cooper, 2008). The positive relationship between work demands and job performance is consistent with the challenge-hindrance stressor argument and implies that
strategies designed to recognise and promote the psychosocial working conditions associated with positive performance should be implemented to optimise employee performance (LePine, et al., 2005; Wallace, et al., 2009). Karasek & Theorell, (1979; 1990) proposed one of the working conditions that stimulates positive performance may be job demands, therefore it is important to consider the potential of workload, alongside resources (control and support), as a beneficial contributor to employee performance.

Overall, the findings from the current investigation suggest that the working conditions described in the DCS may offer valuable opportunities for enhancing in-role and extra-role performance in public sector organisations. The following sections will outline the overall contributions and implications to the stressor-performance research while also taking into account limitations of the current investigation. Recommendations for future research and concluding remarks are also included in this final section.

Contributions

The current investigation made ten contributions to stressor-performance research. The first and perhaps most important contribution is the knowledge this research adds to the body of literature examining the relationship between stress-related working conditions and performance. The current research is one of the few studies to undertake a comprehensive examination of the relationship between the psychosocial working conditions represented in the DCS and multiple forms of employee performance. This assessment included tests for the linear, non-linear and interactive effects associated with the DCS variables. These tests were undertaken to, first, help identify the extent to which these working conditions are associated with employee performance and, second, to help clarify how or under what circumstances the work characteristics may influence worker performance. The current investigation also sought to better understand the pathways through which stress-related working conditions are associated with performance and, to
this end, tests were undertaken to examine the role of attitudinal and health-related variables in mediating the relationship between stressors and performance. Further, both the working conditions and the potential mediators were regressed against four forms of employee performance (IRB, OCB-I, OCB-O, CWB), in order to assess the extent to which any work-performance relationships varied according to the type of performance under investigation. Finally, all aforementioned assessments were undertaken using cross-sectional and longitudinal data and hence the results help to establish the degree to which relationships identified in the cross-sectional results are stable over time.

Although few conclusive findings could be identified in the longitudinal analyses, there were strong signs from the two cross-sectional studies that the stress-related working conditions represented in the DCS are closely linked to employee performance. The comprehensive series of tests undertaken in the current investigation has also helped uncover particular aspects of the relationship between the DCS conditions and employee performance that have important implications for future research and practice in this area (see following contributions for specific details on these aspects). Collectively, the outcomes of the current study suggest that employee performance should be taken into account when examining the effects of stress-related working conditions. Furthermore, the current study highlights the need to pay careful attention to the types of analyses that are undertaken in stressor-performance research and not to assume the relationship between stress-related working conditions and worker performance parallels the stressor-health literature. Finally, in view of the comprehensive manner in which the current investigation has been undertaken, coupled with the paucity of job stress research addressing employee performance, it is hoped that the current thesis can be used to help inform future research in this area.
The second contribution relates to the additive and synergistic effects of the DCS in terms of helping to clarify how DCS variables should be managed in order to enhance employee performance. The issue of distinguishing between the two DCS perspectives is important as the implications for interventions could differ between the interactive and additive models (Jones & Fletcher, 2003). Where the additive model explains greater variance in the relationship between psychosocial working conditions and performance than the interactive model does, it suggests that managing performance in the workplace should be based on addressing the individual effects of demand, control and support rather than the interaction effects. The additive model was supported in the current investigation, suggesting that the levels of control (and/or social support) do not have moderating effects on demands, but are associated with performance outcomes independently, as are demands. The implications of these results are that addressing psychosocial working conditions, independently of each other, may assist in maintaining the resource levels associated with effective performance. An additive model also explained more of the variance in OCB than in IRB, indicating that extra-role behaviour is a reflection of the resources available to workers. As OCB is discretionary and therefore more variable than IRB, employees have more control over their capacity to change their voluntary contributions than their prescribed tasks, in response to their current level of resources (Bakker, et al., 2004). These findings indicate that the DCS has an important role as a resource-based model that can be used to investigate the independent effects of both stressors and resources in stressor-performance research.

The third contribution made by the current study relates to the finding of positive relationship between workload and performance in terms of the difference between research into the effects of stressors on health and performance. Much of the work stress literature takes the perspective that high workloads are detrimental to health and well-
being and that reducing demands will benefit employees and organisations. These benefits are expected to include a reduction in the number of workers compensation claims and lost productivity due to sickness absence (Macklin, et al., 2006). A key study aim was to determine whether psychosocial working conditions contributed positively or negatively to performance, in recognition of the paradoxical view that stressors such as demands may be harmful to health but beneficial to productivity (Daniels & de Jonge, 2010).

The current finding of a positive relationship between workload and performance contributes to the job stress literature by further highlighting the difference that exists between research examining the effects of stressors on health and research assessing the relationship between stressors on performance. Previous job stress research, much of it utilising the DCS model, has largely focused on the detrimental effects that stressors, such as high demands, can have on employee health. Despite strong signs that the model may provide a useful framework for investigating both health and performance outcomes (Cotton, et al., 2002), there has been a lack of DCS research investigating performance as an outcome.

It should be highlighted that the DCS model specifies job demand, control and social support are fundamental in predicting both employee health and productivity (Karasek, 1998). An issue of importance related to research on both of these outcomes concerns the possibility of converse findings for well-being and performance. The ways in which psychosocial working conditions are related to performance may not parallel the relationship between stressors and health. Although there is little research measuring the effects of stressors on performance (in comparison to well-being) there is evidence to suggest that the direction of the stressor-performance relationship can be inverse to the stressor-well-being connection (Daniels & de Jonge, 2010; Schaubroeck & Fink, 1998). Specifically, findings have revealed that stressors can have a detrimental effect on well-
being but a positive effect on performance, and that surplus resources can have an adverse effect on IRB (Schaubroeck & Fink, 1998). The current study proposed that stressors can potentially have either a positive or negative effect on employee outcomes depending on the way in which the individual perceives the stressor and the resources available to them. In contrast to the findings that high demands can have detrimental effects on employees, the current study indicates that high demands may be beneficial to performance.

The results of the current study support the need for organisations to take into account both health and performance outcomes and suggests that competing goals and objectives be addressed to maintain optimal performance and sustain organisational functioning (Hoffman & Tetrick, 2003). A key challenge facing organisations is to monitor job demands to continually assess the way in which these are perceived. While there may be limited scope for adjusting the demands on employees, there may be more opportunities for enhancing control, support and other resource-based conditions.

The fourth contribution made by the current investigation relates to the aim of addressing issues associated with the conceptualisation and measurement of stressors which have been identified as shortcomings in previous job stress research. Inconsistent results among previous stressor-performance studies can possibly be attributed to differences and irregularities in the various measures and conceptualisations of stressors and job performance, which includes the negative connotation of job stress represented in items of many job stress studies (Jex, 1998; Muse, et al., 2003). A negative conceptualisation of stressors presumes that stressors are a hindrance and does not allow for the possibility that the relationship between stressors and performance could be positive. Given that stressors can have a positive effect on performance in certain instances (Karasek, 1979; LePine, et al., 2005; Webster, et al., 2010) measures should present questions about learning, creativity and skill level in a way that can be answered.
positively. Studies that contain the word “stress” bias the response towards a negative interpretation of stress (Jex, et al., 1992). The current study addressed this shortcoming through the use of survey items that do not use the word “stress”, but frame job-related stimulation in terms that may be answered positively or negatively, depending on the perceptions of individual respondents. Consequently, it was possible to find a positive relationship between workload and performance, as outlined in point 1.

Further to designing a study to allow for the possibility of finding a positive relationship between demanding working conditions and performance, the fifth contribution of the current investigation involved the way in which performance was operationalised. Incorporating multiple performance types was based on the premise that job performance not only refers to the quality and quantity of work undertaken by employees as part of their prescribed roles, but also takes into account extra-role activities (O'Reilly & Chatman, 1986) and citizenship behaviours (Smith, et al., 1983).

In addition to positive forms of extra-role behaviour, the construct of CWB (which was identified as a factor in Study 1) was included in the investigation as a measure of behaviour that reduces employee performance and organisational efficiency. Through the inclusion of both positive and negative forms of discretionary behaviour in addition to in-role behaviour, the current investigation was able to provide a richer perspective of performance outcomes than studies that do not include all these measures. In contrast to previous job stress research commonly proposing that stressors negatively affect job performance, results of the current study revealed that higher levels of desirable performance (IRB, OCB-I, OCB-O) and lower levels of undesirable performance (CWB) were associated with higher work demands rather than lower demands. The results do not reflect the majority of previous research suggesting that extra-role could be expected to diminish due to available resources being depleted by dealing with job stress (Bakker, et
al., 2004; Turnipseed & Murkison, 2000). However, it has been reported that a high workload can simultaneously increase feelings of personal accomplishment and work identification (Miles et al., 2002) and these positive emotions, in turn, foster greater OCB (Chu, Lee, & Hsu, 2006). The relationship between competencies and OCB links with the challenge stressor argument, indicating that work stressors perceived as challenging can positively influence various types of performance. This finding implies that competency is therefore important when work is challenging.

From a theoretical standpoint, the results of the current study can be seen as evidence for differential relationships of various facets of performance with job stressors. The finding that the effects of stressors differ according to types of performance lends support to a multi-dimensional conceptualisation of performance that differentiates between in-role and extra-role outputs.

The sixth contribution made by the current investigation relates to the importance of social support as a resource. In the context of the current study, social support refers to work and non-work support. The current study found that both forms of support were positively related to performance. The presence of resources is critical for providing employees with the capability for high levels of performance because worker output depends heavily on the amount of resources available for task accomplishment (Beal, et al., 2005; Luchman & González-Morales, 2013). The resources that are central to the DCS model (Karasek & Theorell, 1990), control and support, can be analysed from the perspective of Conservation of Resources (COR) theory (Hobfoll, 1989). The COR literature proposes that individuals will seek to minimise the discomfort experienced when they are confronted with excessive demands by endeavouring to protect, conserve and build important resources (Hobfoll, 1998). Such resources include energies and conditions
that are valued by the individual. High levels of fatigue are an indication that employees possess insufficient resources to effectively handle the demands of the job (Taris, 2006).

Regardless of whether relationships were linear or curvilinear, both forms of support were positively related to performance. Employees with greater degrees of work and non-work support reported higher levels of IRB, OCB-O, OCB-I and lower levels of CWB. This finding can be accounted for by the theory of work-family enrichment (Greenhaus & Powell, 2006). The theory proposes that psychological and physical resources developed or cultivated in one role can enhance performance in another role. There is evidence that self-esteem, self-efficacy and confidence improve performance across roles since they stimulate motivation, persistence and goal setting (Di Paulo and Campbell, 2002; Erez and Judge 2001; Judge and Bono 2001; Murray, Holmes, and Griffin 2000). These results indicate that supporting employees in combining work and family responsibilities enhances work performance and provides objective gains for the organisation (Van Steenbergen & Ellemers, 2009). There is therefore a growing business case for managers to become more conscious of the importance of work and non-work support, not only in regard to performance outcomes but also employee well-being. Work support was also associated with psychological well-being in a direct, reciprocal relationship, implying that managers should be aware of the role that work support plays as a resource critical to the well-being of employees, in addition to their capacity to perform at high levels.

The seventh contribution involves the importance of resources in terms of OCB particularly, combined with the finding of a positive relationship between workload and performance. This relationship can be explained in terms of resource conservation when specifically applied to OCB. When employees perceive they have resources available and they are not currently overwhelmed by job demands, employees are likely to engage in
activities focused on others, in the form of citizenship behaviour directed towards individuals (OCB-I) and towards the organisation (OCB-O) (Bakker et al., 2004). When the resources available to employees are commensurate with the demands faced, employees are more likely to go beyond their personal roles and engage in activities that advantage the organisation as a whole (Bakker et al., 2004).

Again, this connection between resources and OCB can be explained through the COR theory, in terms of conserving and building important resources (Hobfoll, 1989). Engaging in OCB can serve to build social capital and reduce energy loss in response to increased workloads that threaten the personal resources of employees, such as optimism and vitality (Bolino, et al., 2002; Hobfoll, 2001). Employees will invest resources, as a coping mechanism, where the greatest potential return on investment is possible (Hobfoll & Freedy, 1993). Employees would be expected to conserve resources for prescribed tasks and invest in OCB to develop future social support. The findings of the current study suggest it is possible that employees see more benefit in investing in OCB-O, therefore that is the area in which they are investing some resources as a return on investment. It is also possible that the OCB-O is being directed towards the employee’s supervisor, rather than work colleagues, through behaviours such as adhering to informal rules and conserving and protecting organisational property. It is possible that these kinds of behaviours would build social capital, in line with the argument of Halbesleben and Bowler (2007), although with a supervisor rather than other colleagues, and that these behaviours could also serve as an investment in the development of future social support (Hobfoll & Freedy, 1993).

Engaging in OCB can serve to build social capital and reduce energy loss in response to increased workloads that threaten the personal resources of employees, such as optimism and vitality (Bolino, et al., 2002; Hobfoll, 2001). The implication from this
finding is that managers need to be aware of positive forms of citizenship behaviour and proactively encourage these behaviours within work groups with heavy workloads. If managers can recognise and promote OCB in the work environment, social capital can be increased and resource loss can be reduced, leading to positive consequences for job performance.

The eighth contribution of the study relates to curvilinear effects. Contributing to the observed gap in the literature, a key aim of the research was to comprehensively test the potential for non-linearity among the DCS variables predicting both in-role and extra-role performance in a longitudinal research design. There was some evidence of non-linear relationships. The overall message in terms of curvilinear effects was that although there were no consistent results, evidence of several non-linear relationships implies that it is important to include tests for curvilinearity in future studies.

A further issue related to including curvilinearity testing in the design of stressor-performance research is the ability to capture both high and low levels of stress with the measurement instrument. Studies should use instruments designed to measure the under-stressed condition as well as the over-stressed condition to identify the potential curvilinear relationship between stressors and performance, yet most do not (Muse, et al., 2003). In the meta-analysis by Gilboa and colleagues, curvilinear relationships were not explored, however the authors recommended that further research include curvilinear analyses, particularly as the association between overload and performance could be curvilinear (Gilboa, et al., 2008). Both under-stressed and over-stressed conditions should be included in studies aiming to comprehensively investigate the effects of stressors on performance (Muse, et al., 2003). To this end, researchers need to test for lack of stimulation, apathetic response or being under-challenged, in addition to the mandatory investigation of over-stimulation and its effects on performance (Muse, et al., 2003). A
further limitation of previous studies, in relation to omission of the under-stressed condition, is contextual range restriction. When there is an over-sampling of participants in jobs or professions that are considered highly stressful, a bias towards reporting high levels of strain is likely, in contrast to reporting a range of stimulation levels that include under-stimulation (Muse, et al., 2003). The current study addressed the limitation of focusing only on high-strain jobs by including a wide range of occupations in the sample.

The ninth unique contribution of the current study was to investigate attitudinal and health-related variables as possible mediators in the relationship between stressors and performance. The occupational stress literature generally examines the direct association between stressors and performance (e.g., Muse, et al., 2003; Webster, et al., 2010). This practice, however, overlooks important intermediary influences such as the individuals’ attitudinal or psychological responses to the job and the social and organisational contexts in which the job is undertaken (Cooper, 2008; Fried at al 2008; Jex, 1998).

The current study was designed to identify the mechanisms through which working conditions influence performance with the aim of helping to explain how job stressors might impact on employee performance (Gilboa, et al., 2008). Specifically, the important attitudinal and psychological antecedents of job performance, including job satisfaction, commitment and psychological well-being (Campbell 1990; Jex 1998; Fried et al 2008) were investigated as mediating mechanisms of the relationship between DCS conditions and multiple forms of performance. Although only limited support was found for mediation of the stressor-performance relationship in terms of satisfaction and commitment, the results may suggest that managers should address performance improvement in terms of attitudinal variables. That is, instead of relying on stress prevention strategies to enhance employee performance, management interventions need
to focus more on monitoring and, where necessary, addressing job attitudes such as job satisfaction and commitment levels.

The tenth and final contribution relates to the NPM reforms. The finding that attitudinal variables may have some influence on performance suggests that addressing both satisfaction and commitment is necessary in order to enhance employee productivity and these findings could be of particular significance to public sector organisations operating under NPM reforms. The prominence of job attitudes in the current study, combined with the positive relationship between workload and performance, and the contribution of work and non-work support to in-role and extra-role performance, has important implications in terms of NPM reforms. Creating conditions that enable employees to feel challenged and supported may balance the adverse effects associated with managerialist reforms. Managers can utilise performance feedback and other positive management strategies to ensure that employees working under demanding conditions can optimise their performance. Monitoring satisfaction and commitment levels and being aware of the importance of social support are aspects that managers can address to help employees meet the challenges of the job. As indicated by the integrated framework of organisational health (Hoffman & Tetrick, 2003), employees must feel happy, healthy and satisfied in addition to having the competencies to achieve work outcomes. The findings of the current investigation suggest that employees can deal with the adverse effects associated with NPM reforms provided that performance management strategies ensure employees feel both challenged and supported (Judge & Piccolo, 2004; Keller, 2006).

**Implications**

The current investigation provides a range of implications to be considered in regard to the relationship between psychosocial working conditions and performance. The results of the current study support the need for organisations to take into account both
health and performance outcomes and suggests that competing goals and objectives be 
addressed to maintain optimal performance and sustain organisational functioning 
(Hoffman & Tetrick, 2003). A key challenge facing organisations is to monitor job 
demands to continually assess the way in which these are perceived. While there may be 
limited scope for adjusting the demands on employees, there may be more opportunities 
for enhancing control, support and other resource-based conditions.

An important implication of the findings in regard to social support was that 
supporting employees in combining work and family responsibilities enhances work 
performance and provides objective gains for the organisation (Van Steenbergen & 
Ellemers, 2009). There is therefore a growing business case for managers to become more 
conscious of the importance of work and non-work support, not only in regard to 
performance outcomes but also employee well-being. The direct, reciprocal relationship 
between work support and psychological well-being, implies that managers should be 
aware of the role that work support plays as a resource critical to the well-being of 
employees, in addition to their capacity to perform at high levels.

In regard to positive forms of citizenship behaviour, managers need to be aware of 
their significance and proactively encourage these behaviours within work groups with 
heavy workloads. If managers can recognise and promote OCB in the work environment, 
social capital can be increased and resource loss can be reduced, leading to positive 
consequences for job performance. In contrast to positive performance, CWB was 
negatively associated with workload and higher levels of CWB were associated with a lack 
of support, lower commitment and higher levels of psychological distress in the current 
study. These outcomes suggest that managers need to be aware CWB comprises damaging 
behaviours that employees may engage in when their experiences or attitudes are negative, 
if the opportunity arises. The current study supports the proposition that OCB and CWB
are distinct constructs and that they are not opposite ends of the same continuum. It is therefore important to include CWB when measuring performance as this allows identification of behaviour that goes against the system, violates organisational norms and reflects sub-role performance.

An implication stemming from the link between work support and greater levels of CWB is that CWB could be an indicator of inadequate coping with stress-inducing work conditions (Spector & Fox, 2005) and a sign of poor organisational climate. This finding suggests that there may be an opportunity for workers to engage in behaviours that are detrimental to the organisation, yet escape consequences, if colleagues are also engaging in the same behaviours. The finding also indicates the usefulness of including CWB as an indicator of stress when investigating the relationship between psychosocial working conditions and performance.

An important aspect of the research design in the current investigation was the inclusion of curvilinear terms. Although there were no consistent results, evidence of several non-linear relationships implies that it is important to include tests for curvilinearity in future studies.

Although only limited support was found for mediation of the stressor-performance relationship in terms of satisfaction and commitment, the results may suggest that managers should address performance improvement in terms of attitudinal variables. That is, instead of relying on stress prevention strategies to enhance employee performance, management interventions need to focus more on monitoring and, where necessary, addressing job attitudes such as job satisfaction and commitment levels.

Finally, the findings from the current investigation suggest that employees can deal with the adverse effects associated with NPM reforms provided that performance management strategies ensure employees feel both challenged and supported (Judge &
In terms of implications for people management strategies, managers need to ensure employees undertaking high workloads perceive themselves as competent and their tasks as challenging in order to optimise performance. Employees can be helped to recognise and develop their competencies, while also reinforcing that they have the capacities required to meet the challenges of the job, if managers offer ongoing performance feedback and other positive management strategies. In order to successfully achieve work outcomes, employees need to be happy and satisfied, recognise what is important to focus on, and feel they have the required competencies for their job. Through implementing management strategies including feedback and coaching, managers can help employees to be more aware of their competencies and areas that may represent future challenges and opportunities for growth. Daily communication with the employee and can greatly influence the way that employees experience the work environment, therefore line managers in particular may have an important role in providing feedback due to their constant regular presence (Kowalski, 2012; Lewis, et al., 2012). Relationship-based leader behaviours, including supporting, developing and mentoring employees, have been shown to have a positive impact on a broad range of performance outcomes (Judge & Piccolo, 2004; Keller, 2006).

Limitations

The following is an outline of the limitations of the current investigation. Overall, the results of the longitudinal regression analyses did not provide sufficient support for the relationship between stressors and performance. Therefore, the first limitation of the current investigation is that it relies on cross-sectional data. There were indications that the two/three-way multiplicative DCS term (i.e., d x c/x) may have had some influence on two of the four performance types, however, as none of the regression steps were significant, the main insight arising from the results is that the DCS model may not be a good
predictor of performance longitudinally. The possible explanations for the lack of relationship between the DCS variables and performance will be examined in this section.

One reason that longitudinal studies might fail to find significant results between DCS variables and employee outcomes, could be that effects may take place within a few months rather than periods of a year or more (DeJonge et al., 2001). A further possibility is that employees have the ability to anticipate the future and the emergence of stressful situations, and they can act to prevent this provided they have the opportunity to do so (Fay & Sonnentag, 2003). Employees who have the opportunity to make self-initiated changes in their work responsibilities are more likely to have positive job attitudes and personal outcomes (Oldham & Hackman, 2010). Stressors can be seen as indicators of less than optimal working conditions that need to be changed (Fay & Sonnentag, 2002). In response to stressors, behaviours may be triggered that counteract adverse working conditions. For example, an increased level of OCB-I may aim to reduce stressors, as helping behaviour reduces conflicts in the workplace and improves social interaction and support within the work environment (Fay & Sonnentag, 2002).

It has been argued that because humans have the ability to anticipate the future and the impending reoccurrence of stressful situations, they can act to prevent such a reoccurrence. Stressors point to a discrepancy and a need for something to change, which implies that individuals will subsequently take the initiative to change the situation where possible (Fay & Sonnentag, 2002). In terms of COR theory, Hobfoll suggests that individuals judge whether their resources fit the demands placed upon them and that the “interplay between resources and situational needs changes over time as stressor sequences unfold” (Hobfoll, 1989, p. 521). It is likely that an employee faced with heavy work demands will be able to deal with the stress of the situation provided the job has a degree of flexibility in terms of its allocation of time and energy to work tasks (Sargent & Terry,
This could explain why relationships between stressors and performance are supported in the cross-sectional results but do not come through in the longitudinal analyses.

If it is the case that employees take the initiative to change stressful situations where possible, conditions will vary at each time point in the study and relationships may not hold over time. In order to test this proposition and determine whether time lags of 18 months could be too long, further research could utilise shorter time lags of several months. This may provide evidence of changes that occur within months but are no longer apparent at periods of greater than a year (DeJonge et al., 2001). There is debate about the length of time lags, along with the recognition that it is difficult to determine the correct time lag in job stress research. This issue has been addressed in two reviews of methodological issues regarding longitudinal studies in organisational stress research (de Lange, et al., 2003; Zapf, et al., 1996), one of which reviewed DCS studies specifically (de Lange, et al., 2003). Although health, not performance, outcomes were measured in all studies, the conclusions drawn do provide insights into the challenges involved in selecting appropriate time lags for the investigation of job stressors. In the review conducted by Zapf and colleagues (Zapf, et al., 1996), the most common time lag analysed was over one year. It was suggested that a time lag that is too long is not as problematic as a time lag that is too short. Even though a time lag that is too long can lead to an underestimation of the true causal impact of stressors, time lags that are too short may infer that no causal effects exist at all (de Lange, et al., 2003; Zapf, et al., 1996). Therefore, periods of longer than a year are recommended and that is the reason behind the length of the time lag in the current study.

A further limitation of the current study was the difficulty inherent in measuring and evaluating performance due to the sheer number of contributory factors involved.
Although the DCS was not sufficiently effective in predicting performance, it should be acknowledged that performance is an area that is difficult to study because it is difficult to measure. A conclusion from existing research in the area of stressors and performance is that each performance dimension is influenced by a complex array of factors and it is impossible to specify a single cause or antecedent of each particular type of job performance (Viswesvaran & Ones, 2000). Many factors contribute to performance at the individual, organisational, and extra-organisational levels. Some of these factors include conditions in the work environment, resources and support from various sources, organisational climate and structure, personality and behavioural characteristics of the individual and domestic factors (Fletcher, 1991). It is almost impossible to take all these factors into consideration due to the number of variables involved and issues of measurement. Although not referring to performance, but to health outcomes, Zapf and colleagues (Zapf, et al., 1996) proposed that even if all contributing factors could be measured and assumed to have equal effects, any one factor (e.g. work stressors) could only explain less than seven per cent of the variance. Despite these limitations, it remains worthwhile to examine psychosocial working conditions and employee performance.

Another key limitation of the current investigation utilised a self-report questionnaire to gather behavioural data. Whilst there exists some concern that the self-report method of data collection may inflate correlations between study variables, known as common method variance (e.g., Campbell & Fiske, 1959; Podsakoff et al., 2003), it is suggested that the issue of common method variance has been overstated (Spector, 2006). The self-report method is, however, aligned with the transactional view that working conditions are appraised as potential threats or challenges depending on individual perceptions (Fox, et al., 1993). Subjective evaluations of working conditions, including social support, may actually be more related to psychological outcomes than the working
conditions themselves (Goldberg et al., 1996) as the association between work support and psychological well-being in the reverse causal analyses of the current study appear to indicate (Chou & Chi, 2003). Where individual attitudes and perceptions are concerned, the self-report method is a recommended form of data collection (Howard, 1994). Future research could, however, benefit from the addition of objective measures, specifically with regard to in-role performance.

A final limitation of the current investigation is that only a single public sector organisation was included in the present study, albeit with employees across a variety of occupations. Consequently, further longitudinal research involving both public and private sector organisations would assist in evaluating the extent to which the influence of independent variables holds over time. Given the finding of a positive relationship between workload and performance, it would be useful to determine whether this outcome could be found in other public sector organisations operating under NPM reforms. It is important that further investigation of the stressor-performance relationship be carried out across a number of public sector and private sector organisations in order to further clarify the relationship between psychosocial working conditions and job performance.

Future research

The current investigation has helped to identify a number of areas where future stressor-performance research could be strengthened. These areas are outlined in the following section.

The current study was underpinned by a resource-based model of job stress (DCS) and included both in-role and extra-role performance as outcome measures. Given the finding that workload was positively associated with performance, the implication for future investigations of psychosocial working conditions and performance is the understanding that stressors such as job demand may have positive effects on both in-role
and extra-role performance. The implication that performance may be enhanced through improvements in motivation and resources such as social support, rather than a reduction in workload, suggests that future stressor-performance research should use a resource-based model of job stress. Additionally, it is recommended that future research examining the stressor-performance relationship include the potential for job stressors to be perceived by employees as either challenges or hindrances.

The current finding that psychosocial working conditions were differentially related to positive and negative forms of job behaviour reinforces the need for future research to include a broad range of performance types. In particular, it is recommended that future research includes both in-role job performance, OCB and CWB when investigating the relationship between psychosocial working conditions and performance. Further, researchers should eliminate overlapping content in CWB and OCB scales and also consider measuring the frequency with which individuals engage in each form of behaviour (Spector, et al., 2010).

The results of the current investigation have relevance for the broader public sector. Many public sector organisations are operating under NPM reforms, which have been found to impact on the performance of public sector employees through increased levels of dissatisfaction and decreased commitment generally associated with increased stress. It is therefore important that researchers continue to investigate the role of satisfaction and commitment in contributing to employee performance. Further studies examining the relationship between attitudinal variables and performance would benefit public sector agencies, which are required to manage the constraints associated with NPM and also provide an environment that enhances satisfaction and performance (Judge & Piccolo, 2004; Keller, 2006).
Although there were no consistent results in terms of curvilinear effects, evidence of several non-linear relationships implies that it is important to include tests for curvilinearity in future studies. Should further evidence of curvilinearity be found, the case for more individually targeted management strategies for performance improvement would be strengthened.

Finally, the limitations of the current investigation need to be considered. Further research should be based on longitudinal research designs that include both subjective and objective measures of in-role and extra-role performance across more than one organisation where possible. Future longitudinal studies should also consider the various factors involved in selecting the correct time interval. These factors include the type of outcome being measured, the length of exposure to the stressors being investigated, and whether changes in work characteristics have occurred.

**Concluding remarks**

The current investigation contributed to stressor-performance research in several key ways. The findings revealed that the psychosocial working conditions represented in the DCS are closely associated with multiple measures of performance. The DCS variables collectively accounted for significant amounts of variance in both in-role and extra-role performance, indicating that addressing working conditions may provide a viable means for enhancing employee performance. The positive relationship between workload and performance implies that future research take into account the very real possibility that demand may positively influence performance, as proposed by the challenge-hindrance stressor argument. There was some evidence that job attitudes operate as mediators in the stressor-performance relationship, suggesting that that managers should also approach performance improvement from an attitudinal perspective. In addition, managers and researchers need to be aware of the importance of resources in relation to employee
performance. The use of broader performance measures including in-role, extra-role and negative discretionary behaviour is recommended, particularly as CWB yielded inverse results to those of the other three performance measures.

Overall, the outcomes of the current study suggest that multiple measures of employee performance should be taken into account when examining the effects of stress-related working conditions. Furthermore, the current study highlights the need to pay careful attention to the types of analyses that are undertaken in stressor-performance research and not to assume the relationship between stress-related working conditions and employee performance parallels the stressor-health literature. Finally, the multiple forms of performance examined in the current study are critical for organisational functioning and a failure to consider all facets of employee performance may result in erroneous conclusions regarding the relationship between psychosocial working conditions and the performance of employees.
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Appendix A: Measures of psychosocial working conditions and performance used in the study

Job demands

The quantitative workload scale developed by Caplan, Cobb, French, Harrison and Pinneau (1980) was used to measure job demands, also referred to as workload. Responses were recorded on a five-point scale ranging from ‘rarely’ (5) to ‘very often’ (1), or ‘hardly any’ (5) to ‘a great deal’ (1). Higher scores indicated higher workload demands. Six of the items were reverse-scored so that all of the individual item scores were placed on the same scale with regard to direction. The items in the scale are:

1. How often does your job require you to work very fast?
2. How often does your job require you to work very hard?
3. How often does your job leave you with little time to get things done?
4. How often is there a great deal to be done?
5. How much workload do you have?
6. How many lulls between heavy work load periods do you have?
7. How much time do you have to think and contemplate?
8. What quantity of work do others expect you to do?
9. How much time do you have to do all your work?
10. How many tasks or responsibilities do you have?
11. How much slowdown in the workload do you experience?
Job control

Job control was measured using a nine-item scale developed by Karasek (1985). The scale measures the degree to which individuals are able to make work-related decisions and acquire new skills. Responses were recorded on a five-point scale ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5) whereby higher scores indicated greater job control. The items in the scale are:

1. My job requires that I learn new things
2. My job involves a lot of repetitive work
3. My job requires me to be creative
4. My job requires me to make a lot of decisions on my own
5. My job requires a high level of skill
6. On my job I have very little freedom to decide how I work
7. I get to do a variety of things in my job
8. I have a lot of say about what happens on my job
9. I have the opportunity to develop my own special abilities

Social support

Social Support from within the organisation and from non-work sources was assessed using scales developed by Etzion (1984). The measure contains nine items, seven of which require two answers, the first relating to the employee’s work environment and the second to their life outside of work. These two responses form the two subscales: work support and non-work support. Responses were recorded on a seven-point scale ranging from ‘very little’ (1) to ‘very much’ (7), with higher scores indicating that the sources supported them to a greater extent. To what extent do you get appreciation and recognition for what you do? The questions relating to work and non-work support are:
1. To what extent are you able to share the burden with others in terms of your duties and responsibilities?

2. To what extent do you receive feedback on your performance?

3. To what extent are you able to take time off when you are under pressure?

4. To what extent is support and advice available to you when you are experiencing difficulties?

5. To what extent is the quality of your relationships with others satisfactory?

6. To what extent do you feel emotional support from others?

7. To what degree are you satisfied with your relationships with the following people at work? (supervisors, co-workers, subordinates)

8. To what degree are you satisfied with your relationships with the following people and groups? (partner, family, friends)

**Job Satisfaction**

Job satisfaction was measured with a shortened version of the satisfaction scale from the Job Diagnostic Survey designed by Hackman and Oldham (1976). Respondents were required to rate three items on a seven-point scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7). These three items were summed to constitute an overall job satisfaction score, with higher scores associated with higher levels of job satisfaction. The three items are:

1. Generally speaking, I am very satisfied with this job

2. I am generally satisfied with the kind of work I do in this job

3. Most people in this job are very satisfied with the job
Affective organisational commitment

The construct of commitment to the organisation was measured using the Affective Commitment Scale (ACS) developed by Allen and Meyer (1990) containing eight items. Respondents were asked to rate each item on a five-point scale, ranging from 'strongly disagree' (1) to ‘strongly agree’ (5), according to their degree of commitment to the organisation. After reverse-scoring negatively worded items, the eight items were summed to form an overall affective commitment score, with higher scores indicating higher levels of commitment. The eight items in the scale are:

1. I would be very happy to spend the rest of my career with this organisation
2. I enjoy discussing my organisation with people outside of it
3. I really feel as if this organisation’s problems are my own
4. I think that I could easily become as attached to another organisation as I am to this one
5. I do not feel like ‘part of the family’ at my organisation
6. I do not feel emotionally attached to this organisation
7. This organisation has a great deal of personal meaning for me
8. I do not feel a strong sense of belonging to my organisation

Psychological distress

The K10 (Kessler et al., 2002) consists of a 10 question screening scale that measures non-specific psychological distress. The questions in the K10 focus on anxiety and depression, discriminating DSM-IV cases from non-cases. The survey requires respondents to identify how often they have experienced each symptom over a 30-day recall period. Each item is scored on a five–point scale ranging from ‘all of the time’ (1) to ‘none of the time’ (5). The questions in the measure are:
1. Did you feel tired out for no good reason?
2. Did you feel nervous?
3. Did you feel so nervous that nothing could calm you down?
4. Did you feel hopeless?
5. Did you feel restless or fidgety?
6. Did you feel so restless you could not sit still?
7. Did you feel depressed?
8. Did you feel that everything was an effort?
9. Did you feel so sad that nothing could cheer you up?
10. Did you feel worthless?

**Psychological well-being**

The GHQ-12 (Goldberg & Williams, 1988) consists of 12 items in total measuring self-perceived psychological well-being, also referred to as psychological health. More specifically, six of these items measure normal functioning (i.e., being able to concentrate) and the remaining items measure abnormal functioning (i.e., losing self-confidence). Each item is scored on a four-point scale ranging from ‘not at all’ (0) to ‘much more than usual’ (3). Higher scores on the measure are indicative of higher levels of self-rated psychological well-being. The questions in the scale are asked in the following manner:

Think about your health in general over the past month and respond by circling the number that applies to you. *Have you recently*……..

1. Been able to concentrate on whatever you’re doing?
2. Lost much sleep over worry?
3. Felt that you’re playing a useful part in things?
4. Felt capable of making decisions about things?
5. Felt constantly under strain?
6. Felt you couldn’t overcome your difficulties?
7. Been able to enjoy your normal day-to-day activities?
8. Been able to face up to your problems?
9. Been feeling unhappy and depressed?
10. Been losing confidence in yourself?
11. Been thinking of yourself as a worthless person?
12. Been feeling reasonably happy, all things considered?

**Job performance**

Employee’s assessments of their job performance were measured using a 21-item scale developed by Williams and Anderson (1991). Both in-role and extra-role behaviours were measured via three subscales: in-role behaviour (IRB); organisational citizenship behaviour aimed at the organisation (OCB-O); and organisational citizenship behaviour directed toward individuals (OCB-I). Each subscale contained seven items which were measured on a seven-point scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7). Negatively-oriented items were reverse-scored. An initial factor analysis of the three-factor scale produced a fourth factor containing negatively-oriented behaviours, termed counter-productive work behaviour (CWB) (see Study 1 Factor Analysis for further details). Higher scores for each of the subscales indicated higher levels of either mandatory (IRB) or discretionary (OCB-I, OCB-O & CWB) behaviours. The items in the scale are:

1. I help others who have been absent
2. I help others who have heavy workloads
3. I assist my supervisor with his/her work (when not asked)
4. I take time to listen to co-workers’ problems and worries
5. I go out of my way to help new employees
6. I take a personal interest in other employees
7. I pass along information to co-workers
8. My attendance at work is above the norm
9. I give advance notice when unable to come to work
10. I take undeserved work breaks
11. A great deal of my time is spent on personal phone/email communications
12. I complain about insignificant things at work
13. I conserve and protect organisational property
14. I adhere to informal rules devised to maintain order
15. I adequately complete my assigned duties
16. I fulfill the responsibilities specified in my job description
17. I perform the tasks expected of me
18. I meet the formal performance requirements of the job
19. I engage in activities that will directly affect my performance evaluation
20. I neglect aspects of my job that I am obligated to perform
21. I fail to perform essential duties
THE END